

# Railway Age Gazette

SECOND HALF OF 1916—No. 10.

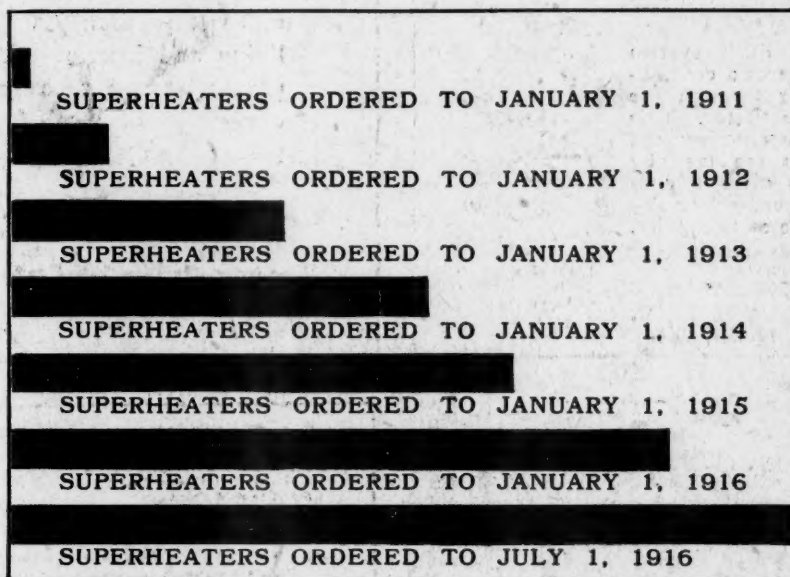
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# Railway Age Gazette

Volume 61

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\*Illustrated.

"We must all hang together, or assuredly we shall all hang separately."—Benjamin Franklin, at the signing of the Declaration of Independence, July 4, 1776.

Was the sentiment embodied in the words of Benjamin Franklin responsible for the wild scramble of the Congress in its efforts to meet the peremptory demands of the President of the United States and the leaders of four labor organizations? What a pity that in this great industrial crisis there was

### The Day of Reckoning Will Come

not at the seat of government one man who had the courage to put aside his political aspirations, as he saw them, to defend the public against the pillage of its treasury—because it is the public who must replace the additional millions that will now automatically flow into the pockets of men who are at this moment the highest paid workingmen in America. It is inconceivable, however, that those who were seemingly ready to sell their respective birthrights for a few thousands of votes should profit from their act which, while aimed at the railways, in effect amounts to an undermining of the whole industrial structure of the country. The reckoning will be far more serious than would have been the results from a strike.

The railway managements of the United States would be guilty of base ingratitude if they did not feel and manifest

### Good Work by the Conference Committee

profound appreciation of the work done by the Conference Committee of the Railways in handling the recent wage controversy. Under the chairmanship of Elisha Lee this committee had to conduct the most important negotiations with organized labor ever carried on, and it did its work with a unity, a skill and a courage that merit the warmest admiration and praise. From the beginning to the end of the negotiations it kept the leaders of the labor brotherhoods on the defensive, and at last so completely outgeneraled them that they had to go to Congress with their threat of a strike. The fact that, with the unexpected assistance of the President of the United States, the brotherhoods finally managed to get their counterfeit "eight-hour day" enacted into law, reflects credit rather than discredit on the Conference Committee of the Railways, for it shows that without the as-

sistance of the government they were unable to win. It required great ability and great courage to deal with the situation efficiently; and it may be said without exaggeration that the committee did deal with it as efficiently as it is conceivable any committee could have done.

While much has been done in recent years to increase the capacity of the locomotive boiler, only a comparatively small amount of attention has been given to the necessity for improvement in firebox design and arrangement. That this particular feature has been to a large extent overlooked is undoubtedly

### Locomotive Boiler Design

due to a lack of understanding as to exactly what takes place in the firebox. For instance, J. T. Anthony, in an article on Locomotive Boiler Efficiency, in the September issue of the Railway Mechanical Engineer, points out that with a low rate of combustion—60 lb. of coal per square foot of grate per hour—a locomotive with 70 sq. ft. of grate area will require 14,000 cu. ft. of air per minute. A little consideration of what this means ought to act as a spur in encouraging mechanical department officers to give more attention to the percentage of air openings through the grates; on many roads the losses are great because of incomplete combustion caused by inadequate air openings. Mr. Anthony points out that if the gases leave the fuel bed at a temperature of 2,200 deg. F., approximately 75,000 cu. ft. of gas will be liberated per minute, with a velocity which will probably approach 7,500 ft. per minute, or 125 ft. per second, which is equivalent to 85 miles an hour. At higher rates of combustion these figures would be doubled and even tripled. The seriousness of the problem is also indicated by approaching the situation from a somewhat different angle. With the same low rate of combustion, Mr. Anthony points out that in the firebox with 70 sq. ft. of grate and a volume of 300 cu. ft. the products of combustion arising from the fuel bed have a volume sufficient to fill the firebox completely four times per second. This means that the average time available for the burning of each particle of gas or coal dust under favorable conditions is only one-fourth of a second. While the problem confronting mechanical department officers is a big one, increased efficiency in combustion

will add to the earning power of the locomotive, as well as improve the economy of operation, and is therefore an object much to be desired.

The Pacific Car Demurrage Bureau, with its three-dollar rate as a potent factor in keeping cars moving, continues to

### Demurrage in California

give lessons to the rest of country in freight-car efficiency. A special report, covering four months' business, is noticed in another column. While the demurrage problem continues difficult, there should be some comfort for the weary station agent in figures, like those for California, which show that it is possible in a movement of 10,000 cars to dispose of 9,826 of them within two days. And of the 174 cars detained, 106 were held only one day beyond the free time. Detention by consignees, however, has not been reduced to this encouraging percentage for, as appears from this report, no less than 52 per cent of the cars making up the total of nearly half a million in California were reported at the loading (not the unloading) station. And nearly 30 per cent of all cars were released before the counting of time began—that is, before the clock hand had had time, following the placing of the car, to reach the hour of 7 a. m. The greater part of this superior promptness was, no doubt, shown in loading, not unloading, for of 10,000 cars placed for loading only 64 were held beyond the free time. For unloading, 282 in 10,000 were held beyond the free limit. California has a marked advantage in its complete freedom from the wasteful "average agreement," which, in distinction from "straight" demurrage is here naively characterized as the "crooked rule." On the Coast, as everywhere, the European war has introduced abnormal conditions; but Manager E. E. Mote expresses the determination to keep up his campaign until the overtime cars are reduced to less than one in a hundred.

### THE TRIUMPH OF MOBOCRACY

THE Reign of Terror is ended, at least temporarily, and the curtain has been rung down on the most disgraceful scene ever enacted in the drama of American government and American life. The labor brotherhoods were unable, by their threats, to overawe the presidents and managers of the railways. There is still some courage, manhood and civic spirit left in this country. But most of these qualities seem to have departed from the city of Washington when the presidents and managers of the railways went away to prepare for the strike. There were a few men in Congress who had the bravery and patriotism to arise and tell the truth about the proceedings leading up to and attending the passage of the so-called "eight-hour" law, but the number was pitifully few. It was insufficient; and democratic government fell, and there was erected where it stood a servile autocracy headed by Gompers and the heads of the railway labor unions. When any body of men get enough power to coerce a government they themselves become the real government.

Have the American people enough sense to realize what has taken place? Have they enough intelligence to appreciate that so long as such odious class legislation remains on the statute books orderly democratic government will be in abeyance? Have they enough energy, patriotism and understanding of their own interests to arise, rescue the nation from the vile clutches which have seized upon it and mete out punishment for what has occurred to the weak, the unscrupulous and the desperate men, both inside and outside the government, who are responsible for it?

The struggle ceased weeks ago to be a contest between the railways and a part of their employees. It became then, and

it still is, and it will continue to be, until it is finished, a contest between reason and brute strength, between order and disorder, between fairness and unfairness, between light and darkness, between courage and cowardice, between democracy and mobocracy. Thus far the forces of darkness have prevailed over the forces of light, the principle of coercion has triumphed over the principle of reason, the principle of disorder over that of order, and mobocracy has been enthroned. But the struggle is not over. We believe the American people understand what has been done, and why and how it has been done, and that the forces of darkness in winning this battle have lost a campaign.

It is unnecessary to review the developments which led up to the recent crisis. The train service employees, constituting less than one-fifth of the employees of the railways, and only a fractional part of the workers of the country, demanded an enormous increase in wages. To avarice they added hypocrisy, and to hypocrisy deceit, by claiming that they were asking for an eight-hour day. The railways refused the demands, but repeatedly offered to arbitrate. The employees as repeatedly refused to arbitrate and threatened to strike; and all the circumstances now indicate that throughout they were encouraged and abetted in their course by high officers of the present national administration, who, the circumstances indicate, had conspired to make political capital out of this awful menace to the nation's welfare, and even to its life. Almost the moment the controversy reached President Wilson he threw overboard the principle of arbitration, although it had been sanctioned by a national law which he himself had signed, and insisted that the railways should grant—a real eight-hour day? No; the counterfeit eight-hour day the train employees were demanding. Did he decide to take this step after hearing both sides? On the contrary, he told the railway officers he had decided on what he would do before he ever saw them.

The railway presidents who had refused to yield to the menaces of the labor unions, also refused to cower before the President's doctrinaire declamations or his attempts to exercise a coercive power not constitutionally belonging to his office. They determined to stand to the last for the principle of arbitration; and they were gratified and strengthened by soon finding that the intelligent public opinion of the country with practical unanimity supported them.

As soon as the decision reached by the railway presidents became known, the heads of the brotherhoods, without the slightest warning to President Wilson, issued the order for a strike to occur in less than 10 days.

Then was witnessed the most shameful performance in American history. About one hundred years ago the British soldiery captured and burned the city of Washington, while the President, his cabinet and Congress fled and hid in the surrounding woods. That was the most shameful event in American history up to this time. But at least those who then captured the national capital, chased out the President and Congress and burned the capital were a foreign foe and the government did not under their coercion pass laws that outraged the sense of justice and the rights, and burdened the resources, of the American people. In every particular the recent capture of the national capital and its consequences were more disgraceful and terrible than its destruction by the British. A handful of men representing about 400,000 of our own citizens descended upon the capital and the halls of legislation. They surrounded them with the menace of force as truly as if they had had guns in their hands. They threatened to destroy the property of every man and concern in the country by stopping railway transportation. Would not a factory be as truly destroyed by cutting it off from its raw materials and its markets as by dropping explosive shells upon it? They threatened to put to death thousands of unoffending men, women and children? May not people



be as truly murdered by starving them as by shooting or bayoneting them?

Let us not deceive ourselves as to what occurred. It was an insurrection of 400,000 men who threatened to ruin and starve the nation unless the nation's Congress within a week passed a law to promote the selfish interest of the insurrectionists at the expense of the rest of the people. It was a revolution; for it was successful and successful insurrection is revolution.

That Congress understood the true significance of the situation is shown by its own conduct. While the terrorists, led by a reincarnation of Robespierre in the person of the arid, loquacious, lean and tearful Garretson, and a reincarnation of Marat in the person of the strike-thirsty Carter, stood over Congress with a stop-watch in one hand and a threat of national ruin, starvation and anarchy in the other, that "august deliberative body" lashed itself into breathlessness and lather by feverish and desperate efforts to pass the "eight-hour day" law before the time-limit fixed should expire! Occasionally one of the Four Tyrants, or perhaps Dictator Gompers himself, would prick the "greatest legislative body in the world" in the seat of the pants, and the way in which, under this form of inspiration, it accelerated its "deliberations" was a wonder to all observers.

What a spectacle! And what have the President and Congress done to prevent a repetition of it? Nothing. Two years ago a strike was imminent which would have tied up all the railways west of Chicago. Only the intervention of President Wilson, and the withdrawal of the railways from their position, for patriotic reasons, and at the urgent request of the President himself, prevented that strike. But nothing was done to prevent strikes on railways. On the contrary, something was done that greatly increased the danger of them. This was the passage by Congress and the signing by President Wilson of the provision of the Clayton act expressly exempting labor organizations from the operation of the anti-trust law. Thus encouraged, the train service brotherhoods formed the most gigantic conspiracy against the peace and welfare of the United States that has been entered into since the Civil war, and by it brought the country to the brink of ruin. After the order for a strike was issued, President Wilson went to Congress for legislation to prevent it. He asked for a law to forbid strikes or lockouts in train service prior to public investigations of the merits of the controversies, for a so-called "eight-hour day" law, and for a law to provide for any increase in railway rates which the increase in wages might necessitate. Congress passed the bill to establish a fraudulent eight-hour day and, without protest from the President, ditched the rest of his program. In other words, it passed the legislation demanded by and for the benefit of those who were threatening to wreck the nation's industry and starve its people, while it gave scant considerations to the bill intended to prevent such crises from recurring. And why did Congress do this? Because our Robespierre, our Marat and their fellow terrorists objected! They said that to provide that controversies must be investigated on behalf of the public before strikes were called, with the resulting wreckage of the nation's industry and murder of its women and little children, would be to reduce to "involuntary servitude" those who prefer to strike first and investigate afterward. One hundred million people must be left forever at the mercy of 400,000, rather than that when the 400,000 happen to feel like striking they shall be required to postpone doing so until some governmental body shall ascertain what they feel like striking about. This is fit logic to be used in a home for the feeble-minded; and yet it might be thought, from the developments in Washington, that it convinced Congress.

But it did not convince Congress. Congress was working

with a pistol at its head. Nor, in view of the recent developments, does all this idiotic talk about "involuntary servitude" convince the American public. The practice of putting restraints on those who disturb the public peace and threaten the public welfare is not unknown in civilized countries; and in every country which is to remain civilized the restraints imposed must be proportionate to the demonstrated need for them.

With a pistol at its head and a bayonet between its coat tails, Congress, with an unprecedented celerity, rushed through the so-called "eight-hour day" bill. The defects of this measure are so palpable and vital that it is inconceivable it can ever go into effect. First, it was passed under duress. Everybody in the United States knows that Congress never seriously considered enacting such a law until President Wilson demanded that this price be paid instantly to buy off those who were threatening a strike. Second, the law does not provide for an eight-hour day. It merely provides that the railways shall pay employees in their train service a day's pay for eight hours' work. It does not provide that train employees shall give the railways eight hours' work for a day's pay. It does not provide that any train employee shall quit work at the end of eight hours, but by requiring them to be paid overtime after eight hours it clearly contemplates that they shall work any number of hours up to the 16-hour limit fixed by the hours of service act. Third, it attempts to provide that the wages paid for the basic 10-hour day shall be the minimum paid for the basic eight-hour day. Is there a lawyer in the United States who believes such a provision is constitutional? It is certainly the first law of such a character relating to the hours and wages of any class of employees of private business concerns ever passed in the history of the world. Fourth, the law discriminates between the 18 per cent of railway employees who come within its terms and the 82 per cent who do not, for it says nothing about the work or wages of the latter.

Confronted with such a statute, passed under such conditions, the course which the railways should and must adopt is plain. They should and must take it into the courts at the first opportunity and carry it, if necessary, to the Supreme Court of the United States. An unconstitutional "law" is no law. It is merely a piece of paper on which printers' ink has been wasted.

If the inconceivable should happen, and this measure should be upheld, the second step which the railways should take also is plain. Their present contracts with the train employees are based on miles run as well as hours worked. In other words, any employee whose train runs 100 miles receives a day's wage, even though the run takes only two or three hours. The employees having got a law passed which bases their wages entirely on hours, the railways, if this measure is upheld, should promptly cancel all provisions in the schedules pertaining to the mileage basis of compensation, and require all their men in train service, passenger and freight, to work or hold themselves in readiness to work at least eight hours a day. These employees have seen fit to refuse to accept arbitration of their demands and to threaten to tie up all the railways of the country and to prostrate its commerce and industry in order to gain their end. Their threat of a strike having proved futile, they went to Washington and coerced the government. The railway managements thus far have met the issue squarely. They should continue to do so. Since these employees are so anxious to have their wages based on hours they should be given full opportunity, if this law is upheld, to work at least eight hours a day.

Doubtless, if the railways attempt entirely to abolish the

mileage basis of pay the country will be confronted again with a threat of a strike. Very good. It is unfortunate from the standpoint of both the railways and the country that the strike was averted this time, since it had to be averted by the destruction of our form of government and the substitution of a mobocracy. The managements are confident that if the strike had come they would have won it, and if the train employees should strike rather than work eight hours a day there can be no doubt that the railways would whip them. The railways should take the stand from now on that if they must pay a day's wage for eight hours' work they must be given at least eight hours' work for a day's pay, and they should maintain this stand regardless of consequences.

There are those, including President Wilson, who talk ominously about government ownership if the railways defend their rights. Better far, from the standpoint of the managements and owners of the railways, that we should go to government ownership, than that they should be subjected to the sort of government to which they have been subjected within the last month. If organized labor and the government are to unite to despoil the railways of every right which has been supposed to be inherent in private property, then the sooner, from the standpoint of the owners of the railways, that government ownership comes the better. If the public can believe that the ownership and management of the railways by a government which will do what the government of the United States has done in this instance is desirable, then the public has so little intelligence and sense of fairness that the railways are bound to be ruined under private ownership, anyway. And what, in heaven's name, must we expect to be the results of the ownership and management of the railways by such a mobocracy as that now in the saddle?

When the presidents and managers of the railways were engaged in a desperate struggle with the railway brotherhoods and the government at Washington, they were adjured by the press and the business interests of the entire country to stand fast for sound principles and for their own rights and those of the public. Now that the principle of voluntary arbitration has been overthrown, what are the business interests and the people, who in the long run will be the most injured, going to do about it? A handful of men organized into labor unions and headed by Gompers, Garretson, Stone, Carter and Lee, are in control of the government. The organized labor led by Gompers is not employed on the railways. It is employed in other industries. If the railway labor unions, aided by Gompers and his crowd, can do to the railways what they have done, then Gompers and his crowd, aided by the railway labor unions, can do the same thing to the other industries of the country. Furthermore, if this fraudulent eight-hour day law applying to train service stands the burden of the increased expense of railway operation which it will cause it will be passed along to the travelers and shippers of the country, and finally to the consuming public. Are the business interests of the country and the public generally going to supinely sit down and let the mobocracy keep control of their government, or are they going to rise in rebellion and rescue their government? Are they going to leave the law in such shape that conspiracies on the part of capital to restrain commerce and industry will continue to be pronounced and punished as illegal, while far more gigantic and harmful conspiracies of labor to restrain commerce and industry will continue to remain legal and to receive even the open, active support of the President and Congress? Are they going to leave the law in such shape that railway employees, whenever they feel like it, can stop the operation of the railways, prostrate commerce and industry and starve the people?

The spokesmen of organized labor, Gompers and the rest of them, already are making public speeches, boasting of the successful outrage which they have perpetrated. The nation, on the other hand, seems to feel so relieved that the strike has been averted as to be disposed to go to sleep again and do nothing to prevent the early recurrence of a similar crisis. If the mobocracy is to be overthrown and the government is to be restored to the people, the people must have leadership. Is there enough statesmanship left in the country to afford this leadership, or has the country so long been dominated by cheap, weak, cowardly, self-seeking politicians that statesmanship has ceased to exist, and that under the mobocracy the nation will continue to sink lower and lower until government of the people, for the people and by the people, contrary to Lincoln's prediction, will perish from the earth?

### CANADIAN PACIFIC

**D**URING the first year of the war there were doubts as to the ability of the Canadian Pacific to continue to earn its 10 per cent dividends. It was only by the most drastic economies, amounting to what might be called a *tour de force* in railroad operation, that a surplus of less than \$90,000 over dividend requirements was shown for the fiscal year ended June 30, 1915. The contrast between this barely scraping through and a surplus after the payment of dividends for the fiscal year ended June 30, 1916, of \$15,444,000 is striking.

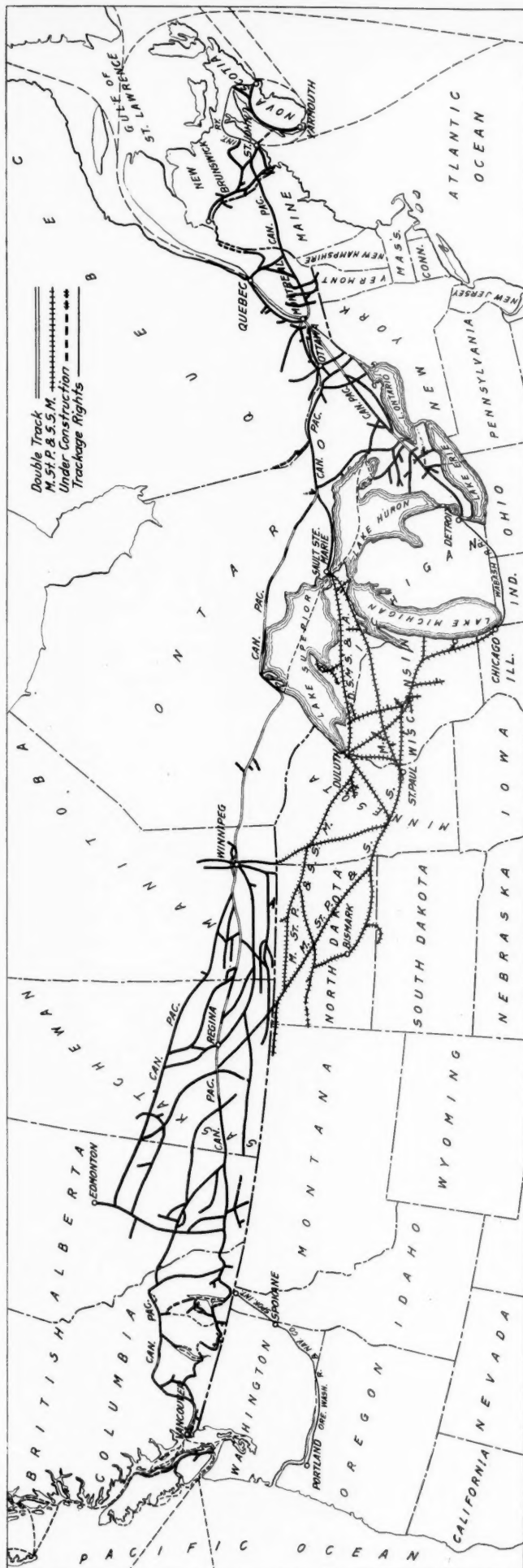
Total operating revenues, including revenues from sleeping cars, express and telegraph, amounted to \$129,482,000 in 1916, as against \$98,865,000 in 1915. Passenger revenue was about the same in both years. The gain of nearly \$29,000,000 was all in freight revenue. Maintenance expenses were abnormally low in 1915. In 1916 maintenance of way and structures cost \$14,672,000, comparing with \$11,401,000 spent on this account in 1915. Maintenance of equipment cost \$16,696,000 in 1916, comparing with \$11,308,000 in 1915. It will be seen therefore that approximately \$8,500,000 more was spent on maintenance in 1916 than in 1915. Total operating expenses in 1916 amounted to \$80,256,000, comparing with \$65,291,000 in 1915, a difference of about \$15,000,000. In other words, doing the same passenger business and earning \$29,000,000 more from freight, the Canadian Pacific spent only about \$6,500,000 more on transportation—the out of pocket cost of handling the business.

But this does not begin to tell the story. The average ton-mile receipts in 1916 were but 6.41 mills, as compared with 7.73 mills in 1915, a decrease of 17.08 per cent. The ton mileage of revenue freight was 78.71 per cent greater in 1916 than in 1915. With this increase of 78.71 per cent in ton mileage of freight there was an increase of about 25 per cent in transportation expenses. This is one of the most remarkable showings ever made by an American railroad management.

The two most important factors in the attainment of the results which were secured in 1916 were slower movement of freight trains and heavier car loading. No new locomotives were bought, there was no grade reduction. Since by far the greatest increase in tonnage came in the tonnage of grain and of manufactured articles and of lumber, presumably the proportion of unbalanced traffic in 1916 was almost, if not quite, as great as in 1915. The average trainload in 1916 was 503 tons, as against 411 tons in 1915, an increase of 93 tons, or 22.61 per cent.

The slower movement of freight trains undoubtedly contributed very much toward this phenomenal gain in train loading and was also a very important factor in holding down many of the transportation expenses other than those caused directly by the movement of additional trains. The man-





The Canadian Pacific System

agement put in force a rigid rule that freight trains should not run a mile in less than two minutes. The speed of freight trains was checked not only by division and district officers, but special checks were made continuously. To enforce an order such as this on a railroad operating 12,993 miles means the most remarkable driving power by the officer in charge of operation that can be conceived of. Whether or not the Canadian Pacific was anywhere near 100 per cent perfect in getting this order enforced is questionable, but that a really wonderful measure of success was attained is self-evident from the figures in the 1916 annual report. Prior to the control of speed the average number of cars derailed from broken wheels or other causes in one derailment was six. After the speed control order had been put into effect, out of 152 instances of broken wheels, axles, running gear or other defects the average number of cars derailed was half a car.

The average number of tons of revenue freight per loaded car was 22.90 in 1916 and 19.13 in 1915. This is an increase of nearly 20 per cent in loading per loaded car. In carrying 78.71 per cent more ton miles in 1916 than in 1915 there was an increase of only 49.34 per cent in loaded car mileage. There was an increase of 94.06 per cent in empty car mileage, which goes to bear out the supposition that the increase in trainload was not helped in the slightest by a better balanced traffic.

In all probability the Canadian Pacific management was helped to a very appreciable extent in obtaining both the enforcement of the low speed order for freight trains and the heavier loading of cars by the fact that the patriotism of both employees and shippers could be appealed to for help. Employees are more than ordinarily desirous of co-operating with their officers—the spirit of military obedience to rules was probably easier to enforce on the Canadian Pacific in both 1915 and 1916 than ever before or than it ever has been on any large railroad system in the United States. Shippers also felt the necessity of co-operating with the Canadian Pacific management to the end that the country as a whole might benefit. Making full allowance, however, for the outside help that the management would not have had had it not been for war conditions, the drastic cutting down in expenses in 1915 and the enforcement of two rules, simple in themselves, but for that very reason extraordinarily hard to enforce, on a system of nearly 13,000 miles of railroad running from the Atlantic Coast to the Pacific, will go down in American railroad history a monument to the men at the head of the management which achieved it.

The balance sheet at the end of 1916 looks again like the balance sheet which in the years previous to 1915 was expected in a Canadian Pacific annual report. Cash on hand amounted to \$41,582,000 with no loans and bills payable and, what is unique for a great railroad company, practically no mortgage bonds outstanding.

The following table shows the principal figures for operation in 1916 as compared with 1915:

	1916	1915
Mileage operated .....	12,994	12,917
Passenger revenue .....	\$24,690,652	\$24,044,283
Freight revenue .....	89,654,405	60,737,737
Total operating revenues .....	129,481,886	98,865,210
Maint. of way and structures .....	14,671,791	11,400,539
Maintenance of equipment .....	16,695,956	11,307,965
Transportation expenses .....	38,915,382	32,083,170
Traffic expenses .....	2,798,699	2,990,164
General expenses .....	4,014,754	3,963,203
Total operating expenses .....	80,255,965	65,290,582
Net operating income .....	49,225,920	33,574,627
Fixed charges .....	10,306,196	10,446,510
Net income .....	38,919,724	23,128,117
Transferred to special income .....	1,923,289	1,494,151
Dividends* .....	21,427,277	21,419,051
Surplus .....	15,444,159	89,915

\*Following its regular practice the Canadian Pacific declared in both 1915 and 1916 three per cent on the ordinary stock out of special income not included in dividends in the above table.

## Letters to the Editor

### DR. DUDLEY DESERVING OF THANKS

PITTSBURGH, Pa.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Dr. P. H. Dudley deserves thanks for disclosing to the rail manufacturers the results of his extended investigations of some of the causes of transverse fissures in rolled steel rails. Dr. Dudley advises reheating the bloom as a help which, of course, is correct and partially effective. There is, however, considerable doubt as to that factor regularly controlling the transformation activity of a heterogeneous condition of the metal through the head during completion, or absolutely eliminating the transmitted effect of the gag.

On January 31, 1908, the writer contributed an article to the *Railroad Age Gazette* entitled "A Compound Rail." In that article certain effective progressive remedies in rail rolling were recommended, mainly for the purpose of minimizing irregular transformation of the metal in the rail head. While certain physical fundamentals were implied—but not explained at length—they can be read into almost all recent developments in rail betterment. For instance, it is well known that during rolling the heat works outward as the metal is progressively reduced, and when a metal reduction is equal to and accompanied by a corresponding equal drop in temperature, the workable state of the metal is naturally extended to a state in rolling where absolute control of the granular transformation is secured (because there is no longitudinal tension) and a homogeneous structure is "trapped" before enlargement of grain takes place; thus internal strain is avoided. Therefore, a figure of symmetrical proportions will always admit of a regular progressive reduction at a satisfactory natural relation in temperature. That is why an unbalanced figure must be finished hurriedly, before figurative distortion is excessive and at the expense of good structural attainment.

Our standard type of rail is a continual aggravator of discrepancies that mystify the investigator who would eliminate the troubles without altering the general shape of the section.

A. W. HEINLE.

### THE GRAPHIC TRAIN SHEET

HAILEYVILLE, Okla.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

"The Graphic Train Sheet." These words have passed through my mind several times since I read them in the *Railway Age Gazette* of June 23. Can it be that after 15 years of train despatching a new form of train sheet with a few squares and templets will afford me substantial aid?

When an engineer dropped off of his engine and told the operator that his engine was leaking badly and he did not know whether he could get her in, could I lay down a templet and tell when he would be at the terminal?

If a drawbar was pulled out on the main track and held a fast passenger train, could I, by laying down a templet, secure any information as to when the track would be clear and how to change the meeting points? Nay, verily. Neither would such action assist in making better meeting points between the local and a drag, or between a light engine and one with half a train. As far as making temporary schedules is concerned, it would be of no value because the despatcher, keeping in mind a certain speed, frames his schedules in his mind; and that process is followed closely by the mechanical process of distribution to the offices. Very few despatchers of experience, and who have worked on a division long

enough to become acquainted with it, stop to figure out a schedule on paper before putting it out.

As for checking speed schedules, the time at the different stations shows for itself, and any one familiar with speed would readily discover any violation of restrictions. Again, where the telegraph offices are far apart, as at night, the use of the templet would not show that the engineer did not violate speed restrictions at some place where there was good track or a favorable descending grade. No mechanical device will ever be invented that will improve train despatching.

J. L. COSS.

### ACCURACY IN CAR RECORDS

SHREVEPORT, La.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

At one time our office was burdened and overworked, due to so many incorrect car numbers and initials shown on the conductors' wheel reports, and agents' interchange reports. These errors had to be corrected; this often necessitated sending out tracers, all of which consumed time. For the past two years we have been keeping close check of errors, bulletining the performance made by our people.

During March, 1916, there was shown on the conductors' wheel reports the initials and number of 15,389 cars handled; out of this number we found but 20 incorrect numbers and initials, which figures about .0013 of one per cent imperfect records.

Our situation with interchange reports was equally as creditable for March; 8,471 cars were actually handled through the interchange, with only 5 open, or imperfect, records, or .00059 of one per cent.

Our campaign against wrong numbers and initials has, as above stated, been in effect during the past two years, and has resulted in receiving almost perfect information to post our records. Good records are the fundamental starting point in car accounting work. The rest of the duties are predicated on and emanate from car records. If they are accurate and complete it has the tendency of minimizing the necessity for corrections in per diem settlements, and all car accountants are aware that the per diem situation, as a whole, is deplorable. And this without any reference to the colossal amount of labor involved in handling the per diem claims, and the fact that the car owner is deprived of from one month to five years of the earnings on his car while in possession of the handling line which is unable to make proper adjustments because the records are incorrect; meanwhile a lot of time and letter writing are wasted without results or accomplishing closing out the open, or wrong record. We dare say unsettled per diem in the United States and Canada will exceed four million dollars.

Good records are essential and are the prime factor in avoiding a voluminous amount of work.

E. F. BUCHANAN,

Car Accountant, Louisiana Railway & Navigation Company.

ROUTE FOR NEW RAILWAY IN COLOMBIA.—The Minister of Public Works of Colombia has adopted for the proposed railway from Cali to Popayan the route recommended by a committee of the Colombian Society of Engineers in a recent number of the *Diario Oficial*. This route, which is almost wholly in the valley of the Cauca river, was found to be the shortest and most practicable of the various routes suggested by the Pacific Railway in a report to the Colombian Government in 1915. With the completion of the railway to Popayan, the capital of the Department of Cauca and the terminus of an old commercial road running south through Ecuador, an important region would be opened to shipping through the port of Buenaventura.



## Foundation Work on the Metropolis Bridge



The Piers for the New Ohio River Crossing Will Soon Be Completed. Interesting Caisson Details Are Used

Construction Plant at Pier 4

THE work on the Metropolis bridge across the Ohio river, which is being built jointly by the Chicago, Burlington & Quincy and the Nashville, Chattanooga & St. Louis, is progressing rapidly. The viaduct approaches at each end have been completed, the caissons of all but one of the piers for the substructure of the river bridge have been sealed, the shafts of piers 1, 2, 6, 7 and 8 have been completed, the neatwork on piers 3 and 4 is well up and the sinking of the caisson for pier 5, the last one to be started, is now in progress. The steel for the deck span between piers 7 and 8 is erected and swung and work on false work for the record-breaking 720-ft. clear span, between piers 6 and 7, has been started. A brief general description of this bridge appeared in the *Railway Age Gazette* of July 23, 1915, and more detailed information with respect to the viaduct and the steel work was given in the *Railway Age Gazette* of May 12, 1916, page 1025. Like other large bridges over the Mississippi river or any of its larger tributaries, on which work has been under way during the last two years, the progress has been hampered materially on account of the unprecedented duration of high water conditions.

An accompanying drawing shows the outline and dimensions of pier 6, the largest one in the bridge. It is 173 ft. high from the cutting edge of the caisson to the top of the coping and contains about 15,700 cu. yd. of concrete. The top of the pier is 65 ft. long by 19 ft. wide. The shaft has ends of a semi-circular section for a distance of 42 ft. from the top of the coping down to the top of the starling and the length of the pier just under the starling coping is 77 ft. 7 in. At the bottom, the pier spreads by a series of offsets to a footing having a length of 110 ft. and a width of 60 ft. This great bearing area is necessary to keep the pressures within limits consistent for the material available for the support of the piers. The foundation is sand and gravel. Bed rock in this locality could not be utilized for the foundations as it is located at an average distance of about 250 ft. below low water level.

The piers are entirely of concrete, no stone masonry being used although for the sake of appearance they are given a bush-hammer finish. The entire surface of the piers is reinforced with a net work of one-inch bars, placed two feet center to center both horizontally and vertically. These bars are anchored into the body of the pier at intervals of 2 ft. horizontally and 4 ft. vertically by hook bars extending into the piers. Above the starling these hook bars are continuous from face to face.

### THE CAISSONS

Owing to the large dimensions of the footing the caissons are of large proportions and had to be designed and built to transmit the vertical load of the piers, which is distributed over a smaller central area, to the friction surfaces of the four sides. The distribution of the load thus imposed on the caissons before sealing is taken care of by a reinforced concrete slab, 19 ft. in thickness, which completely fills the space inside of the shell above the roof of the working chamber. This slab is reinforced by a grillage of 1¼-in. reinforcing bars at the bottom and by a frame work of steel trusses placed vertically in both longitudinal and transverse directions with a spacing of 11 ft. center to center. However, the principal office of the steel frames was to stiffen the caisson and support the roof of the working chamber until the concrete was placed and had set.

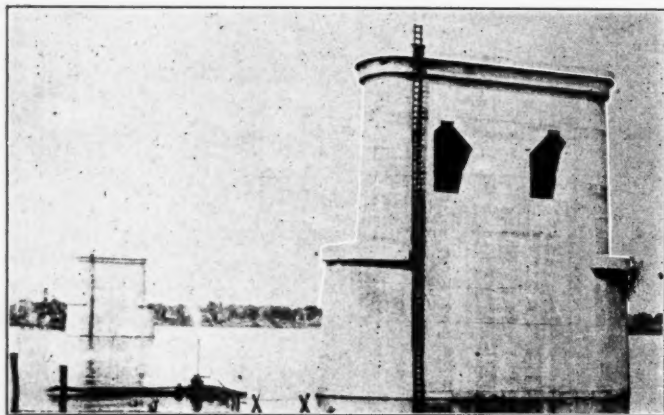
The accompanying drawing shows the details of the caisson for pier No. 5. This was the last one sunk and embodies certain modifications from those previously used as a result of the experience gained in the sinking of the earlier caissons. The greatest difference was made in the side walls. The caisson shown in the drawing has walls consisting of three thickness of 12-in. by 12-in. timbers, which are placed vertically in the outer and the inner layers and horizontally in the middle layer. The superimposed load from the shoes is applied by means of large cast iron distributing shoes of a design commonly used for the bearings of short span girder

bridges. This load is taken by the middle or horizontally-placed layer of timbers and is transmitted to the outer layer by means of mortices formed by offsetting two courses of the horizontal timbers 2 in. into the outside layer.

In the earlier caissons the walls consisted of two thicknesses of timber, the outer layer horizontal and the inner one vertical, the load being applied to the inner layer. The change in design was made because of some difficulty experienced in the earlier design through a tendency of the horizontal joints between the outside timbers to open as a result of the skin friction.

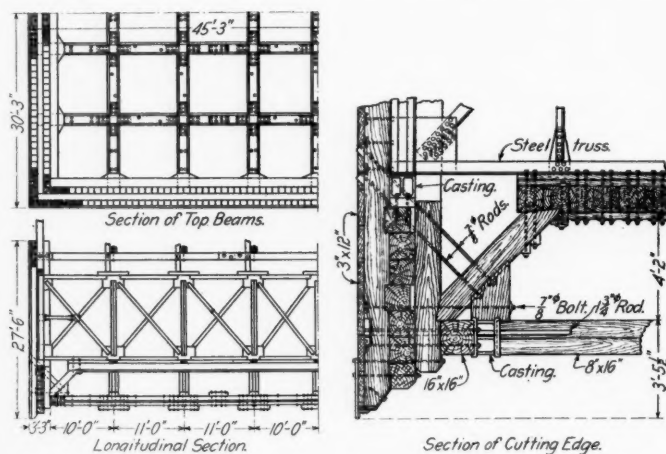
The roof of the working chamber consists of 12-in. by 12-in. timbers supported by bolts from the bottom flanges of the

12-in. timbers, braced in the plane of every fourth course by a system of longitudinal and transverse struts, 11 ft. center to center. The removal of the walls as soon as the concrete work had been completed above the water line was accomplished by sawing off the struts that passed through the concrete work of the pier and by removing the bolts that held the cofferdam down. Cables were provided to prevent the



Piers 6 and 7

steel trusses and is connected to the side walls by a solid wall of 12-in. by 12-in. knee braces framed to the roof and the side walls. The walls are bridged by a system of transverse and longitudinal struts spaced 11 ft. center to center in each direction. These struts consist of 8-in. by 16-in. timbers

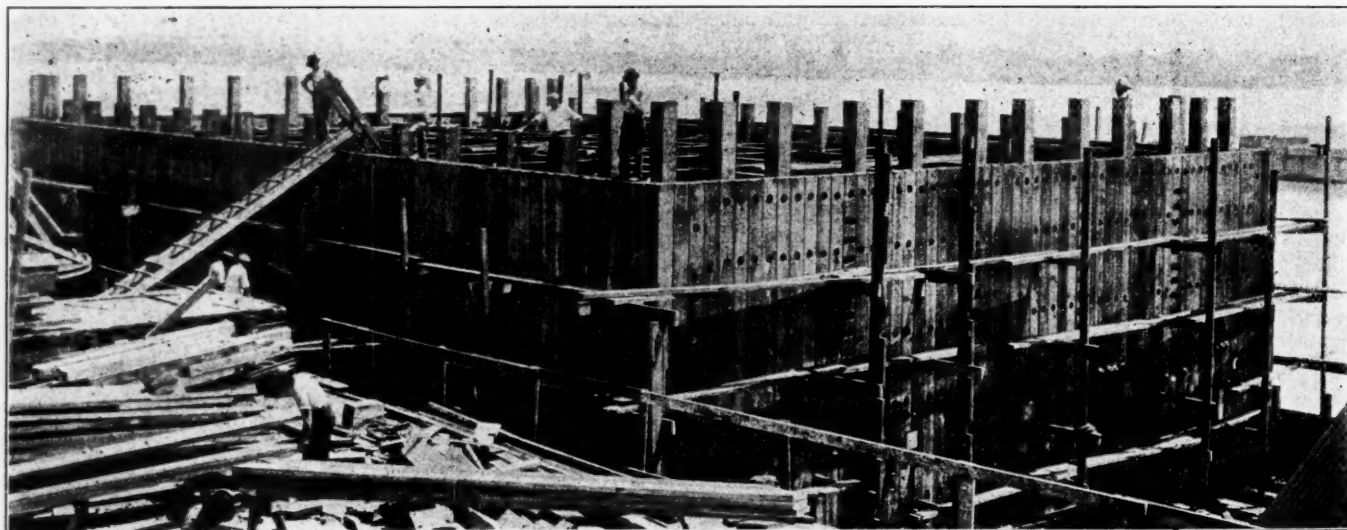


Details of the Caisson for Pier 5

floating of the cofferdam until the workmen, who were removing the fastenings, could reach a place of safety. The use of cables also made it possible to float the cofferdam slowly.

#### CONSTRUCTION METHODS AND PLANT

With the exception of the caisson for pier 1 where the ground surface is above water at ordinary stages, all of the caissons were built in a floating dry dock or pontoon, in which they were towed into position. One of the accompany-



Building the Caisson for Pier 5 at the Construction Dock

ing photographs shows the caisson for pier 5 in the pontoon, the latter being a barge with a hold of sufficient depth to obtain the desired bouyancy. For the purpose of sinking the pontoon to permit the caissons to be floated out, the former was equipped with six narrow wooden tanks, three on each side, that could be filled with water. They were supported on posts at a height sufficient to keep them out of the water when the pontoons had been submerged a sufficient amount to release the caissons. About 90 tons of water was required for this purpose. While the caissons are being built, the pontoons are moored at a construction dock, extend-

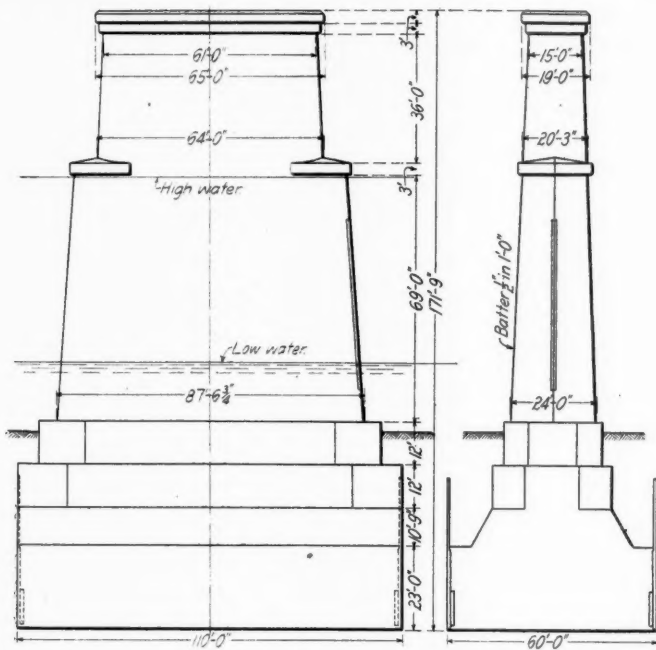
laid flatwise one on the other and taking bearing on a 16-in. by 16-in. girt through cast iron bearing shoes similar to those used for the vertical loads. A tie rod  $1\frac{3}{4}$  in. in diameter is provided on each side of each strut.

A cofferdam of the same horizontal dimensions as the caisson extends for a height of 32 ft. above the top of the latter. Advantage was taken of the fact that the pier above the top of the caisson slab does not occupy the full section of the cofferdam to build the cofferdams in such a way that considerable portions could be saved and re-used. They consisted of horizontal courses of 12-in. by 12-in. and 8-in. by

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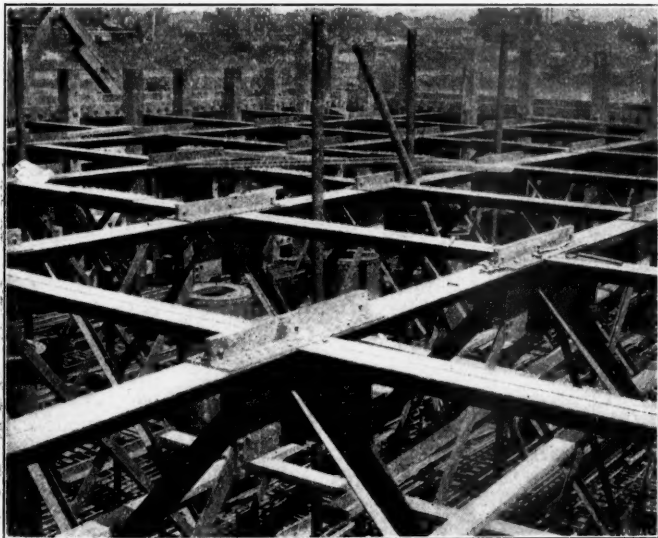
ing some 400 ft. out into the river from the Illinois side. This dock and the track serving it are supported on a pile trestle structure at a sufficient elevation to keep it out of the water at high stages of the river. The trestle passes in close proximity to piers 1 and 2 and its presence greatly facilitated the work on these two piers. An accompanying photograph



Outline of Pier 6

shows the stiff-leg derrick erected on the trestles to facilitate the concreting of pier No. 2.

Two of the photographs show work in progress on pier 4 and indicate the character of the plant provided, nearly all of which is carried on barges. One barge is equipped with a power plant which contains boilers, air compressors, gen-



Steel Framework for the Caisson Slab

erators for electric lights and the hospital lock. The second is fitted as a double deck barge for the accommodation of the sand hogs and a third is fitted with a complete concrete plant. In addition two auxiliary stiff-leg derricks are provided, one supported on a barge and the other on a pile falsework surrounding the pier. These derricks are used to handle the form sections, piping, lock sections, etc.

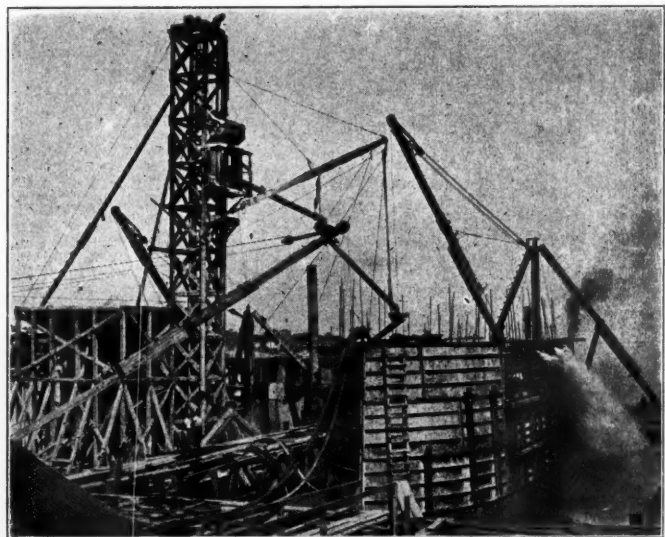
The concrete plant is on a barge 36 ft. by 110 ft., in the

middle of which a one cubic-yard mixer is mounted under a large bin for the storage of the concrete aggregate, which in this case is a bar-run Tennessee river gravel. A 75-ft. tower is provided adjacent to the gravel bin for elevating the concrete to a spout hopper, a derrick boom being mounted on the side of the tower for the support of and shifting of the concrete spout. At one end of the barge a house is provided containing a 60-hp. boiler and a hoisting engine for operating a stiff-leg derrick used to unload gravel from the gravel barges to the storage bin. This hoisting engine also operates a self-dumping cement car which runs on a track at the other end of the barge to transport the cement from the cement barge to a charging platform located just above the mixer. This concrete plant has made runs of 700 cu. yd. of concrete in 12 hours.

Several of the photographs show the character of the forms used, most of which are Blaw sectional flanged steel forms, braced by steel studs and wales. The forms for the two battered faces of the pier are universal and could be used on any pier at any height. The sections for the starling could be used only once on each pier but were re-used on the several piers in turn. The circular section portions of the pier above the starlings were built with wooden forms lined with sheet metal.

#### CONSTRUCTION PROGRESS

Seven of the piers have pneumatic foundations. Pier 8 on the Kentucky end of the bridge stands back a considerable

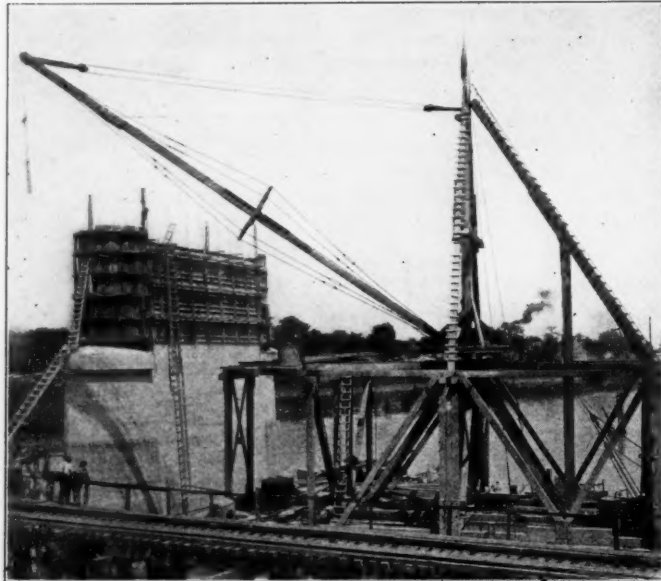


Sinking Pier 4, Concrete Plant at the Left

distance from the normal shore line and was sunk by means of an open caisson. Work was commenced on pier 1 in July, 1915, and the sinking of the last caisson, that for pier 5, is now in progress. Pier 1 was landed and sealed in the middle of September, 1915, pier 7 on the opposite bank of the river, was commenced shortly afterward and landed early in December. The work on pier 6 was commenced early in October and work on piers 2 and 3 was started in December, but operations of all three of these piers had to be discontinued about the end of the year on account of the high water. At pier 6 the water was 60 ft. deep, and the penetration was 33½ ft. giving a total immersion of 93½ ft. The stage of the water, which went to 43 ft. on the gage during January and February, did not drop to a stage that made it feasible to recommence the work until about the first of March, when work was resumed on piers 3 and 6. The sinking of these was completed about the first of April and for pier 2 in the latter part of May. On June 7 work was started on pier 4 which was landed on July 22 of this year with a maximum immersion of 113.2 ft., the depth of penetration

being 73 ft. and the depth of water 40.2 ft. The greatest penetration was obtained at pier 2 which went 96 ft. below the bed of the river at the site of the pier.

This bridge was designed under the direction of the late C. H. Carlidge, chief engineer of the Paducah & Illinois Railroad, and the construction was prosecuted under his direction until the time of his death. The bridge work is now under the direction of Ralph Modjeski, who had served as consulting engineer on the project, with the construction



Construction Plant at Pier 2

under the immediate direction of C. R. Fickes, chief engineer of the Paducah & Illinois Railroad. A. Engh, assistant bridge engineer, Chicago, Burlington & Quincy, has been in direct charge of the designing. The Union Bridge & Construction Company, Kansas City, is the contractor for the substructure.

#### FOUR MONTHS' DEMURRAGE RECORD IN CALIFORNIA

E. E. Mote, manager of the Pacific Car Demurrage Bureau, San Francisco, Cal., has prepared for the American Railway Association a special report on the doings of his bureau for the four months ending May 31, 1916, in which he shows that the number of cars held beyond the free time at the stations under his authority, was 2.21 per cent of the whole number reported, this being the record of 632,006 cars recorded during the four months.

In the state of California, where, on nearly all traffic, the demurrage rate is \$3 per car per day, the percentage was only 1.74. The average percentage held overtime in Arizona was 3.55, in New Mexico 4.06 and in Oregon, 8.37. The report calls attention to the fact that these percentages are based on the total number of cars subject to demurrage rules, including those released before the free time expired.

The special temporary rate of \$2 a car, after the fifth day, double the ordinary rate, which was allowed by the Interstate Commerce Commission because of freight congestion, was in force during the period covered by this report.

The demurrage records take account of a car from 7 a. m. on the day after the car is placed; but cars are often released by consignors and occasionally by consignees, prior to that hour, and these are included in the statement contained in the report, so that the table includes 8 time items, namely: released before the beginning of free time; released the first day; released the second day; released the first charge day;

second charge day; third charge day; fourth charge day; and fifth charge day or later.

Mr. Mote says that by keeping careful records of all cars, including those released within the free time, sums aggregating thousands of dollars in demurrage have been collected which would have been lost if agents had not been required to report these cars.

In California, Arizona and New Mexico, oil tanks are allowed only 24 hours' free time. In California \$3 is the rate on all commodities, but no demurrage is charged on traffic going to ocean steamers. In Arizona the rates are the same as in California. In New Mexico the rate is \$3 on tank cars, but is only \$1 on all other cars. In Oregon the rate is \$2 on intrastate traffic and \$1 on interstate traffic. In Oregon the average agreement is allowed on both intrastate and interstate traffic.

In California more than half the total number represents cars held for loading; but less than 1 per cent of these cars were held overtime, whereas 2.82 per cent of the cars held for unloading were held overtime. The 1.74 per cent of all cars reported held overtime is made up from three classes, namely, cars held for loading, cars held for unloading and cars held for reconsignment, the latter being 3.31 per cent of all cars reported. Of cars released before the expiration of the free time, in California 29.45 per cent were released before the free time began to run; 50.99 per cent on the first free day; 19.56 on the second free day. Of the cars held overtime, 60.89 per cent were released on the first charge day, 20.40 per cent on the second charge day, 8.67 per cent on the third charge day; 3.90 per cent on the fourth charge day and 6.14 per cent on the fifth charge day or later.

A separate table is given, showing the number of cars containing freight to be delivered to coastwise and trans-Pacific steamers. On coastwise freight a period of five days is allowed free. In this traffic the total number of cars was 4,907, of which 213 were held 599 days overtime, and collections were made amounting to \$1,737. Of trans-Pacific freight, the number of cars was 7,352, of which 5,453 were released within 15 days (average number of days 4.48), while the number of cars held over 15 days was 1,899. If demurrage had been charged after 15 days the collections on this trans-Pacific freight would have been \$242,856. This sum, however, does not represent the whole of the loss on these cars, as it was nothing unusual for freight to be held 100 days before reaching the port of exit. In many cases export freight was unloaded and stored in order to secure the use of the cars, or to avoid the payment of per diem. There has been a movement to limit the free time on trans-Pacific business to 15 days, but it has not yet been agreed to by all of the competing lines.

The very much larger detention in Oregon than in California—8.37 per cent of the cars as compared with 1.74 per cent—is attributed to the lower rates and to the average agreement.

In California 34 per cent of the cars held overtime contained hay, potatoes, grain, fruits and vegetables; commodities held for market conditions. Sand, rock, cement, etc.—articles used in building highways—made up 41 per cent, and 3 per cent of the cars contained coal. Many coal dealers found it cheaper to pay \$3 a day and sack the coal in the car rather than unload and rehandle it. Four per cent of the cars contained automobiles; and sums of \$60, \$90, and in one case \$132, have been paid in demurrage on cars containing automobiles. One dealer interested in this traffic says that there ought to be a rate of \$10 a day on such cars.

The commodities just referred to make up 82 per cent of the California record; the other 18 per cent includes all sorts of commodities. The smallness of the number of cars detained with miscellaneous freight is held by Mr. Mote to prove that the high demurrage rate has forced the general public to



provide facilities necessary to unload their freight promptly.

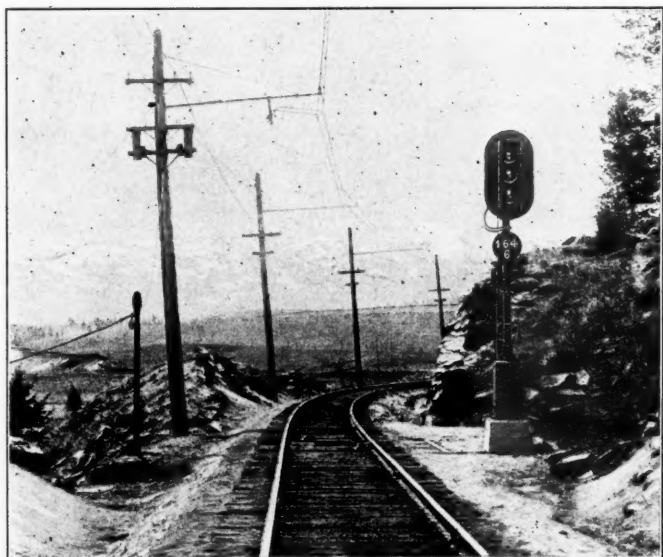
On intrastate traffic, except in New Mexico, demurrage has to be cancelled whenever there is inclement weather during the first two days; and within the period of four months, \$3,143 has been refunded, but interstate cars at the same places and during the same time have been released promptly.

Freight business has been disturbed very generally by the lack of ocean vessels due to the European war, and to the blockade of the Panama Canal. These two factors caused some increase in the number of cars held overtime.

Mr. Mote repeats his conviction that a high demurrage rate is necessary; that the average agreement, which he calls the "crooked rule," should be abolished; that allowances on account of weather conditions should be abolished; and that ocean carriers should accept responsibility for the detention of freight cars.

### LIGHT SIGNALS ON 440 MILES OF ROAD

The Chicago, Milwaukee & St. Paul, in electrifying 440 miles of its main line in Montana, an extensive and unique work with which the readers of the *Railway Age Gazette* are already well acquainted, has adopted lights for its block signals, both for the day and the night indications, doing away entirely with motion or shape signals (semaphores), and the installation, the longest single installation of light signals ever made, is now nearing completion. Work on the electrification had progressed sufficiently in the early part of 1915 for a decision to be reached as to the signaling required. The existing signals, worked by direct-current apparatus, had to be replaced by a. c. equipment. In order to rearrange the signals for more satisfactory operation, and



Typical Signal Location; Line Transformers, Cable Post, Impedance Bond

also because of the obstruction to the view of signals by the electrification pole line it was decided to adopt light signals. The materials for 130 miles of the new signaling, covering the two existing installations of semaphores and an extension of 16 miles on one of them, was ordered from the Union Switch & Signal Company in 1915, and early in 1916 similar orders were placed for an additional 250 miles and for the reinstallation on non-electric sections of the road, farther west, of the d. c. equipment removed on the electrified zone.

At present a total of 134 miles of the electrified line has been signaled, comprising two stretches between Lennep and Three Forks, and between Piedmont and Finlen, crossing

respectively the Big Belt and the Rocky mountain summits. Work is under way on the remainder of the installation, which will cover the entire electric zone, with the exception of a 38-mile section in the Bitter Roots, where the staff system now in service will be retained. On this section there are numerous tunnels. The completion of this work will provide continuous block signaling from Harlowton to Seattle and Tacoma, a distance of 877 miles.

There are usually eight signals between sidings, an average distance of 7 miles. The circuits are so arranged that a permissive feature is obtained for following movements, allowing a shorter overlap than for opposing moves. The light signals are the three-light model 14 type, having white, green and red indications. These three colors correspond to the several positions of a three-position semaphore. Red indicates stop. Green indicates proceed, prepared to stop at the next signal. White indicates proceed; and that the next signal may be expected to show green or white.

Each lens is illuminated by a main lamp and a pilot lamp, burned at a lower voltage, which gives an indication in case the main lamp burns out. The signal is also provided with a small red marker lamp (below the number plate), which is staggered with regard to the main lenses. This marker is designed to locate the signal at night if for any reason the indication should not be displayed. The range of the signal light in daytime is 3,000 ft. on tangents under normal conditions and 2,000 ft. under the most unfavorable conditions, with the sun shining directly into the face of the lens. In the clear atmosphere of this region the sunlight is intense.

For use on curves the lenses are provided with special deflecting prisms which give the light beam a wider spread and allow the indication to be observed for a much greater distance around the curve than would otherwise be possible. Some of these signals were in service last winter, and it was noted that the indication could be seen during a driving snow storm in the daytime several times farther than it would have been possible to have seen a semaphore blade.

Provision was made for dimming the light signals at night, but it was found that the day indication, while very bright at night, was not too glaring to be uncomfortable, nor was it confusing to the enginemen, and so it was decided not to dim the lights at night. The reports from the enginemen and trainmen with regard to the light signals have been very favorable. They say that they can pick up the indication at a greater distance and with less effort than was possible with the semaphore signals.

The power required for the signaling system is transmitted at 4,400 volts, 60 cycles, on a line consisting of No. 4 solid copper wire. Oil sectionalizing switches are provided at the passing sidings, so that in case of line trouble power may be supplied up to each side of the trouble from the adjacent sub-station. Normally one sub-station will handle the entire load between it and the next one. Under this condition the maximum line drop will be between 3 and 4 per cent.

The line transformers at each signal location are 4400-110 volt General Electric type H, with a capacity of 0.6 or 1.0 k. v. a., depending on whether one or two track circuits are fed from the particular location.

There are usually five track circuits between sidings, the average length of these circuits being 6,000 ft. They are fed from 0.5 k. v. a. U. S. & S. track transformers having a primary of 110 volts, and a secondary of 18 volts, with taps. A reactor is used in the transformer leads to track. Model 15 two-position vane track relays are used, the normal voltage on the track element of the relay being about 1 volt, thus allowing a margin for wet weather conditions. The local element of the track relay is wound for 110 volts. The track rails are 90-lb. and are bonded to capacity. The impedance bond for the propulsion current has a capacity of

1,500 amperes per rail on the 2 per cent grades. On the lesser grades, impedance bonds having a capacity of 500 amperes per rail are used. The ballast is disintegrated granite, which resembles gravel in character. The ballast is free from the rails and well drained with a few exceptions in yards, making very favorable track circuit conditions.

A supplementary negative feeder is connected to the neutral points of the impedance bonds, usually at every other track circuit, although at shorter intervals in some cases. This negative feeder offers a path for the return of propulsion current when it becomes necessary to remove rails. This cross bonding to the negative feeder is so laid out that broken-rail protection will still be provided by the track circuits.

The line relays are either three-position model 15 vane or two-position single-element vane. The single-element vane and both elements of the model 15 vane line relays are wound for 110-volt operation.

The signals, relays, track transformers and reactors were made by the Union Switch & Signal Company and the mechanism cases were wired complete at the Swissvale shops.

## THE RELATION OF RAILWAY PERSONNEL TO MILITARY DEFENSE

By George Duncan Snyder

Deputy Chief Engineer, Hudson & Manhattan Railroad,  
1st Lieutenant, 22nd Engineers, N. G. N. Y.

It did not require the great European war to teach the United States that those engaged in transportation could serve their country in a better way than by carrying a rifle, for in the first Militia Act, that of May 8, 1792, ferrymen and pilots were exempt from its provision.

The mobilization, concentration, feeding and supply of armies of the tremendous size of to-day, is only made possible by railway transportation, and it follows that, in the creation of these armies, to obtain the maximum of efficiency, the railways forming the arteries of supply should not be restricted by unnecessary drafts on their personnel. In developing the resources of the country to their maximum of efficiency in war, the railways must perform their part, both in preparing prior to the event and during the war, and a study of the relation of their personnel to our defensive organization may prove of interest.

We can dismiss the relations of the railway personnel to the regular army in time of peace, as the recruiting officers do not draw materially from the men on the railway payroll. The relations of the railway employees to the National Guard and volunteers is a different matter that deserves careful attention. Some railroads have taken a very liberal attitude towards their employees serving with the militia, and this is commendable. The railroads can well afford to do this, in view of the small proportion of their number who enter the military service. But with the proposed increase in the National Guard the proposition to create a force of volunteers in time of peace, with the possibility of both these forces as well as the Regular Army being very much augmented in time of war, the question as to how far the railway personnel can be drawn on, without impairing its efficiency at the time when it should be at its best, becomes serious.

Railway employees may be divided into two classes:

- 1st—Those who are actively engaged in operation and maintenance and whose places cannot be filled from the general population.
- 2nd—Those who are not employed in the direct operation of the roads, such as the clerical staff, etc., and whose places can be filled by those past the military age, or by women.

Those in the first class should not be interfered with, while those in the second class should be treated the same as the employees of any other business.

The ordinary line regiments—the infantry, cavalry and artillery—which form the bulk of the army, should not be recruited from the railway personnel; but there is one arm of the service in the recruitment and training of which the railways should assist, and that is the Corps of Engineers.

This corps, among other duties, is charged with the construction, operation and maintenance of the railways within the zone of hostilities. The corps of engineers of the regular army has no opportunity for practical experience in railway work in time of peace, and reliance would, therefore, have to be placed in time of war on the National Guard organizations composed of experienced railway men, or on volunteer railway troops organized and trained after the commencement of a war.

Recognizing our deficiencies in this respect, the Division of Militia affairs has been encouraging the organization and training of a proper proportion of engineer troops in the National Guard, who would be trained in their railway, as well as their other duties, and with a proportion of practical railway men among their personnel.

It has not been the practice in the training of engineer troops of the regular army to have them specialize as railway, pontoon or pioneer companies, but to train all alike. In the case of the volunteers, or National Guard, however, it will probably be wise to permit the railway troops to specialize at least so far as to have their personnel selected from practical railwaymen. An organization composed of competent railroad men would be able to perform with credit almost any duty assigned to it, whether in its specialty or not. The officers of an organization of railway troops should either be technical men from the civil or mechanical engineering department or officers of the operating or transportation department. The enlisted men should come from practically all departments of a railway. There should be a few young civil engineers, draftsmen, surveyors and topographers, but the bulk should be skilled mechanics of various sorts—enginemen, firemen, trainmen, carpenters, machinists, trackmen, linemen, and men with experience on the wreck crew.

As the engineer troops only form about five per cent of the strength of the mobile army, and as only a portion of them need be railroad men, it would seem that the railroads can well afford to encourage their men to enlist in engineer organizations. It will prove of little value, no matter how well the railways of the interior are organized and equipped for their war time duties, if the men are not provided to extend and operate the railway lines within the war zone.

The railways of the country should also, by co-operation with the War Department, provide facilities for the practical training of selected groups of engineer officers and soldiers from the regular army, militia and volunteers, in railway construction, maintenance and operation.

It would, therefore, seem that the attitude of the railways should be to encourage enlistment and assist in the training of officers and men who will be engaged in working the military railways in time of war, but that they should only furnish men for other regiments as long as they can reserve an ample staff to operate their lines to meet the demands of wartime conditions.

**AEROPLANE EXPORTS FIVE MILLIONS.**—Aeroplane exports for the fiscal year ended June 30, 1916, were 269, against 152 to June 30, 1915, and only 34 to June 30, 1914. The valuation of the exports of aeroplane parts for the fiscal year ended June 30, this year, was \$4,843,610, but only \$583,427 and \$37,225 for the fiscal years of 1915 and 1914.—*Iron Age*.



# Convention of the General Foremen's Association

## Among Subjects Considered at Chicago Were Car Department Problems and Relations of Foremen to Men

THE twelfth annual convention of the International Railway General Foremen's Association was called to order by the president, L. A. North, on Tuesday morning, August 29, 1916, at Hotel Sherman, Chicago. After the divine invocation by Doctor Frank W. Gunsaulus, the association was welcomed to the city by Daniel Webster from the prosecuting attorney's office, the response of the association being made by W. W. Scott. President North then made his address. He said in part:

"This association was formed for educational purposes and in the selection of subjects this point has not been lost sight of. We realize that it is only by the careful study and the expressions of the members that the points are brought out which are of value in the handling of men and materials. It is also well to keep before the members of the association the idea that their advancement and promotion depends on their ability to look ahead and prepare for the future. As general foremen, you are leaders; the examples you set will largely govern the actions of your subordinates. By using tact and good judgment you can secure their confidence and loyalty."

After a brief address by Dr. Angus Sinclair in which he spoke of the important part which the influences surrounding the apprentice have on his success in after life, the report of the secretary-treasurer was presented. The association has a total membership of 229, of which 200 are active members, and there is a balance in the treasury of \$86. Secretary Hall called attention to the growing influence of the association, as proof of which he stated that requests have been received for copies of the proceedings from Tokio, Japan; Bolivia; Peru; Manchester, England, and from South Africa.

On Wednesday morning the association was addressed by Frank McManamy, chief boiler inspector of the Interstate Commerce Commission, the following being an abstract of his remarks:

### MR. McMANAMY'S ADDRESS

The purpose of the regulations or inspection rules which were established as provided by the locomotive inspection law of March 4, 1915, is to more definitely show when a locomotive is "in proper condition and safe to operate" as required by Section 2, and to guide the railroad company and its employees and the Federal inspectors so their compliance with and enforcement of the law may be along uniform lines. Broadly speaking, the law requires locomotives to be maintained in "proper condition and safe to operate" and provides for an organization to see that it is complied with. The rules are more specific and definitely fix the responsibility for the performance of certain tests, inspections and repairs required by them. I shall not attempt to explain or define each rule, but will try to make clear those that are somewhat general in their terms and with respect to which numerous questions have been asked.

Rule 2 is identical with rule 7 of the boiler inspection rules. It definitely fixes the responsibility for failure to make inspections as required by the rules and requires the mechanical officer in charge at each point to know that inspections and repairs are made in accordance with the rules.

The general purpose of Rule 4 is to require the present practice of inspecting locomotives daily to be continued and to avoid, if possible, the necessity of requiring additional sworn reports of inspection. Form 2, which is required by Rule 4, was intended to accomplish two definite purposes:

first, to insure an inspection of each locomotive at certain prescribed periods, and, second, to require the foreman or officer in charge to know the condition of the locomotive, and to say why defects reported were not repaired before the locomotive is returned to service.

This rule will assist in definitely fixing the responsibility for operating defective locomotives. It will also require the foreman to exercise more careful supervision over the work, so that he may properly sign the report. These inspection reports must be filed in the office of the railroad company where they can be checked if necessary.

I have no doubt that many of you feel that these rules have placed additional burdens upon the foreman, but such was not the intention and a proper observance of them will result in just the opposite. They will require each man to shoulder the responsibility that rightfully belongs to him.

If the foreman uses the report as was intended and makes it show the exact reason why repairs were not always made, the responsibility will be placed exactly where it belongs. If proper material is not provided, or if the appropriation is exhausted, or if the transportation department refuses to let him hold the locomotive, that fact should be noted on the report so that it may be considered in determining the reason why the repairs were not made. If the foreman attempts to cover up all such conditions by showing repairs made, which, in fact, were not made, he will be shouldering a burden that he will soon find himself unable to carry.

The locomotive inspection law has not been in force long enough to show any material results. In fact, during the first year or two that any such law is in force the principal thing that can be accomplished is to investigate accidents and classify the causes so that we may determine just what remedies to apply. Enough data has already been obtained, however, to justify a word of warning and advice with respect to the inspection and repair of certain parts where in the interest of safety former practices should be improved. Draw gear between the locomotive and tender, including safety chains or bars with their fastenings, should be frequently and carefully inspected, 22 accidents resulting in 2 killed and 21 injured having already been reported due to failure of the draw gear.

Reversing gear has caused 38 accidents, most of which could have been prevented by proper inspection and repair and by providing sufficient clearance around the reverse lever to prevent injury when handling it.

Failures of rods and crank pins have caused 23 accidents, resulting in 1 killed and 25 injured. There is no doubt that a better method of inspecting these parts can and should be followed, although it must be admitted that the defects which cause failures are usually of a character which are difficult to detect. However, better maintenance of rods and boxes will do much to prevent such defects from developing and thereby aid in preventing accidents.

Failure of springs and spring rigging, which is frequently said to be of little importance from a safety standpoint, has killed 2 and injured 7 since such accidents have been reported to us. These parts should be given more attention and in no instance should a washout plug with a projecting square head be used where it can be struck by springs or equalizers in case of failure. Many similar matters might be enumerated, but enough has been said to direct attention to the causes of some of the most frequent and serious acci

dents and to give a general idea of the purpose and scope of the work of the Locomotive Inspection Bureau.

#### CAR DEPARTMENT PROBLEMS

E. E. Griest, master mechanic, Pennsylvania Lines West, Fort Wayne, Ind.—It is the tendency on most roads to rely on the car foreman entirely for all matters connected in any way with the car department, the general foreman confining his activities entirely to the locomotive department; consequently, when he is promoted to a master mechanic, he has only a hazy conception of the nature of the work and importance of the car department. It is the purpose of this paper, through a discussion of some of the problems encountered, to call attention to the necessity for a more complete and accurate knowledge of car work.

There are operating today on the railroads of the United States approximately 2,000,000 freight cars, the cost to maintain each of which is estimated at from \$80 to \$100 per year. Assuming \$90 as an average figure, the total amount expended annually in the United States for repairs and inspection of cars is approximately \$180,000,000. This is no inconsiderable part of the total spent for the maintenance of equipment. A recent comparison made of the car and locomotive department payrolls on a certain part of one of the large railroads showed that the car department averaged 40 per cent of the total, and the locomotive department 60 per cent. The following itemized cost of operating a freight train of 50 cars 100 miles furnishes another indication of the relative amount of money spent in each department:

Locomotive maintenance .....	\$12.97
Fuel .....	10.44
Freight car maintenance .....	55.10
Total .....	\$78.51

Although the nature of the work is considerably rougher and can be handled to a large extent by unskilled labor with a smaller investment for equipment, it does not necessarily follow that the problems that must be met and solved are any the less important or any the less difficult to solve. In a number of ways the larger problems are very similar to those in the locomotive department.

However, in at least one important feature car work varies from locomotive work entirely, and that is in the repairs to foreign cars. The M. C. B. Association has formulated a code of rules governing the interchanging of and repairs to freight cars. Each railroad company is expected to give to foreign cars while on its line the same care as to inspection, oiling, packing, adjusting brakes, and repairs that it gives its own cars.

Considering that approximately \$180,000,000 is expended annually by the railroads of the United States for repairs to freight cars, and that conservatively estimated 20 per cent of this amount, or \$36,000,000, involves repairs to cars on foreign roads, and considering also that this enormous sum of money is exchanged between railroads without any definite means of checking against the work performed by repairing lines, it will be realized that the repairing of foreign cars and billing for the repairs occupies a unique position in business. There is perhaps no other line of business where such large sums of money are exchanged merely on the basis of common honesty. In order to protect the car owner, and that the principles upon which this important branch of railroad work are founded may be safeguarded, two things are necessary: First—adequate supervision; second—a thorough and efficient system of preparing original records and compiling charges from such records.

**Training Car Inspectors.**—It is no small part of a car foreman's duty to assure himself that his inspection forces are thoroughly familiar with and able to apply the M. C. B. rules governing the interchange and inspection of cars, the United States Safety Appliance Act, the Loading Rules of

the M. C. B. Association, and the Tank Car Specifications. The best and easiest method to accomplish this is to see to it that the men who are promoted to inspectors have received proper training. A car inspector must be able to discover the parts which have actually broken down and defects which may develop into subsequent failures.

A car inspector should know something of the way in which repairs are handled on the repair track, and inasmuch as he must make repairs himself, it is almost a necessity that he be a proficient repairman. After being picked out as a prospective inspector, he should be moved about on various classes of work, so that when the time comes to use him as an inspector he will have had some training on every class of work, on truck work, on steel cars, on wooden car repairs, on light repairs to loads and empties. Some roads hold written examinations on the M. C. B. rules and all other rules governing the inspection of cars at stated intervals. Other roads have a division general car inspector whose duty it is to go from point to point where inspectors are stationed and by questioning ascertain whether or not the inspector has a reasonable working knowledge of the rules, and whether he is able to apply them. The training of a car inspector is by no means a simple task. It requires thought and careful attention. Once it is accomplished in a satisfactory manner, it requires more careful attention on somebody's part to see that the inspector does not become lax and inattentive.

**Car Apprentices.**—The apprenticeship system in the car department on some roads has declined to a point where there are few, if any, apprentices enrolled. The exact reason for this is not apparent. The need of apprentices is fully as great today and even greater than it was 10 years ago. If the ever-increasing cost of repairs is to be cut down to any appreciable extent, it must come about through the efforts of a more capable and better trained force than our present one. Old methods and old ideas must give way to improved ones.

An adequate apprenticeship system should provide for:

1. A sufficient amount of time spent in each department to give the apprentice a clear idea of that part of the work.
2. A rate of pay which would attract boys of some education.
3. Promotion for the better grade of apprentices.

The scheme adopted in most locomotive repair shops of having a definite schedule, according to which an apprentice serves a set amount of time in each department, ought to be just as applicable in the car department. A proposed schedule of this kind is given below.

FIRST YEAR	
Freight car repair tracks.....	6 months
Passenger car repairs.....	6 months
SECOND YEAR	
Pipe shop .....	3 months
Tin shop .....	3 months
Smith shop .....	3 months
Planing mill .....	3 months
THIRD YEAR	
Car machine shop .....	3 months
Paint shop .....	3 months
Air brake work .....	6 months
FOURTH YEAR	
Inspection of freight cars.....	6 months
Inspection of passenger cars.....	6 months

**Dismantling Cars.**—With the increase in prices paid for scrap material, both for lumber and metal parts, the question has again arisen as to whether more economy could not be shown if cars were torn down and all material saved than if they were burned down, and some material wasted to save the increased labor cost of tearing down the cars. Up to this time it has always been felt that it would cost more in labor to reclaim such material than it was worth. Recent investigations seem to show that this is not the case. A study made on the comparative saving effected in burning and tearing down a number of box cars shows a distinct saving effected through tearing down the cars, as follows:



	Car cut up by hand	Car burned
Value reclaimed metal material.....	\$33.592	\$33.592
Lumber reclaimed.....	23.25	7.56
Scrap credits .....	23.12	23.12
Total value of all material reclaimed...	\$79.962	\$64.272
Cost to destroy .....	9.00	8.64
Net value of reclaimed material.....	\$70.962	\$55.632
Saving effected by tearing down cars, Per car torn down .....	\$15.33	

The work of tearing down these cars was all done day work with considerable room for improvement in methods and in the amount of material saved. The proposed plan of handling the work was as follows: Secure enough cars to fill one or more tracks with from 10 to 20 cars each, spacing them about 10 ft. apart; assign four men to each car, two of them to begin stripping off the roof and two to removing grab irons, brake staff and outside metal. The men removing the roof could, before leaving the top of the car, loosen the siding. After removing the roof, outside metal and doors, the four men could then take down the lining, loosen the belt rail and remove the siding. The upright rods should be cut at the floor level, the longitudinal rods should be taken out, the frame work thrown to the ground and the rods still remaining in the frame driven out. Two men could then remove the deck, while the other two men take down the draft rigging and remove the air brake material.

The work of cleaning up the track, assorting the metal, classifying and piling the lumber should be done by another gang of two men to each car. With this organization it was estimated that a gang of six men ought to tear down and pile and assort all the material from one car in eight hours.

There are a variety of uses to which reclaimed lumber can be put. The siding can be used for roof boards and for sheathing of buildings; car lining can be used for sheathing car sills for foundation work and framing. Car decking can be used for platforms. The scrap lumber is worth about \$2 a cord in the market, or about \$1 per car. The second-hand lumber can be estimated at about \$10 per 1,000 ft. reclaimed. The metal parts are in much better condition for use when cars are torn down instead of being burned. From all figures available, it appears that considerable economy can be effected by abandoning the practice of burning condemned cars.

*Discussion.*—The paper and the discussion all indicate a growing appreciation on the part of locomotive department foremen of the importance of the car department. As the general foreman of the locomotive department is usually in line for promotion to the position of master mechanic he should endeavor to become familiar with car department matters by keeping in touch with the car foremen. The work of the car department not only involves the actual mechanical work of repairing cars, but also requires a knowledge of the Master Car Builder's rules, the safety appliance standards, rules for loading material, etc., about all of which the general foreman should acquire some knowledge.

The opinion was expressed that sufficient interest has not been taken in the subject of car department apprentices. An apprenticeship system is needed to develop the right kind of material for foremen in this department.

Several suggestions were made for the prevention of hot boxes. A case was mentioned in which considerable trouble from hot boxes was found to be due to the practice of the car repairmen of putting new wheels in service without scraping the paint off the journals. It was thus impossible to detect slight burrs or rough spots which might be on the journals before they were placed in service. By scraping off the paint and inspecting the journal it is possible to smooth up any rough spots which may be found, with a file and emery cloth.

#### LOCOMOTIVE COUNTERBALANCES

H. E. Warner, New York Central West.—There are two forms of driving wheel counterbalance in general use—the style commonly used on wheels of large diameter, where it is

possible to obtain sufficient weight far enough from the center of the wheel to obtain the required balancing effect, is the one cast solid with the wheel centers. On wheels of small diameter, where it is impossible to obtain enough weight in the required space, the counterweights are cored hollow and then filled with lead. It is the practice in some of the large shops to pour the lead into open chambers, which are covered with a steel plate bolted on, or the core holes are tapped and plugged. This prevents any possibility of the lead being lost out or shaken loose and rattling around as the wheels revolve, which might occur in improperly cleaned and filled closed chambers.

This weight in the wheels must balance all the revolving parts, and a portion of the reciprocating parts. The greater the proportion of reciprocating parts that are balanced, the smaller will be the longitudinal disturbance of the engine, but the greater will be the vertical disturbance. This unbalanced vertical component causes the pressure of the driver on the rail to vary during its revolution, and if the engine is running at high speed the effect on the rail is like the blow of a heavy hammer. On the other hand, if too little of the reciprocating parts is counterbalanced there will be an excessive longitudinal disturbance of the engine.

On the Chicago & North Western the practice is to make the final adjustment of weight in the counterbalance after the axle and crank pins have been pressed in. The wheels, with crank pins, nuts and washers in place, are so arranged that the journals can roll on level straight edges. On main wheels of outside hung valve gear engines both eccentric cranks must be in place. On the side opposite to the one being weighed a weight equal to the weight of the back end of the eccentric rod must be hung on the eccentric crank pin; the crank pin on the opposite side from the one being weighed should be alone and in a vertical line drawn through the center of the axle. Weights are hung on the crank pin until the wheels are balanced, and will remain in any position. The sum of these weights should equal the required unbalanced weight, which is composed of that portion of the main rod and side rod plus the reciprocating weight, which belongs to the wheels being balanced. If the sum of the weights does not equal the required unbalanced weight at the crank pin, then additional weight must be added, or, as the case might be, weight should be removed from the counterbalance until the wheel does balance. All the revolving weights belonging to each wheel and all the reciprocating weights on one side, less the total weight of engine divided by 400, are balanced. This weight is to be equally divided among all the wheels on one side.

The practice of the New York Central corresponds to the rule adopted by the American Railway Master Mechanics' Association, except that the weight of the reciprocating parts minus 1/400 weight of engine is changed when necessary to come inside the following limits: For wheel centers under 58 in. in diameter the minimum is 55 per cent, and the maximum is 66 per cent of the total reciprocating parts. For wheel centers over 58 in. in diameter the minimum is 60 per cent, and the maximum is 66 per cent of this weight.

*Discussion.*—B. F. Harris, So. Pac., stated that the two-thirds rule is used on that system, the overbalance in any wheel being limited to an amount which, when multiplied by 38.4 times the radius in feet of the center of gravity of the counterbalance, will not exceed 75 per cent of the static wheel load. The following method is used in correcting counterbalances: To ascertain the weight in the driving wheels which is unbalanced by the weight of attached parts, take two horses of convenient size and on these place two rails weighing not less than 72 lb. per yd. The upper surfaces of the rails should be made perfectly smooth and covered with a thin lubricant. Place the mounted wheels so that the journals will rest on the rails, which must be parallel and perfectly level both longitudinally and transversely.

Draw one line across the face of one of the wheels, through the centers of the axle and crankpin, and another line through the center of the axle at right angles to the first one. The second line indicates the position of the pin and counterbalance on the opposite wheel. On a line midway between these two, viz., 45 deg. from each, fasten a 10-ft. wooden straight edge. Measure off from the center of the wheel on the straight edge a distance of 60 in. and, with the straight edge level, place a vertical support at this point with its lower end resting on a platform scale. This will weigh both counterbalances at the same time. Ascertain the weight of the vertical support and the end of the straight edge resting on the scale, the other end being supported at a distance of 60 in. from the scale or at the center of the axle. Subtracting this weight from the former weight the remainder will be the weight of both counterbalances corrected for a distance of 60 in. from the center. To find the effective counterbalance for one wheel at crankpin distance multiply this remainder by the length of the lever, that is 60 in., and by 1.4142 (secant 45 deg.) and divide by twice the crankpin radius in inches. This method is based on the assumption that the weights in the two wheels are alike, as both are weighed together and no means is provided for correcting for differences between the two wheels.

Several members objected to the practice of distributing the overbalance for reciprocating parts among the drivers other than the main wheel. This leaves the main wheel light and if the amount of the overbalance thus distributed is large it will cause the rod bushings to pound out and may lead to the fracturing of the rods. The use of counterbalance bobs placed on the main axle inside the frames has effected a reduction in the wear on rod bushings in such cases.

#### FITTING UP SHOES AND WEDGES

W. E. Warner, New York Central West.—The importance of having the shoes and wedges properly adjusted on a locomotive frame cannot be overestimated. A set of shoes and wedges improperly adjusted may cause an endless amount of trouble in the operation of the engine, as, for instance, the breaking of side rods and main frames, the cutting of flanges and numerous other defects to the locomotive mechanism. In order to lay out shoes and wedges correctly it is necessary that the frames be correctly laid out and machined. They should be set up in a square and level position properly adjusted, the binders in place and bolted as tightly as possible without setting up any unnecessary strain. The pedestal jaws should be chipped and filed to a plane surface, because the shoes and wedges must have a solid bearing against the jaws. Otherwise they are liable to break when too great a force is applied to them.

[A method of laying out shoes and wedges was here explained in detail.]

*Discussion.*—The discussion indicated that the practice of laying out shoes and wedges which was given in the report is generally followed. Exception was taken, however, to the use of lines through the center of the cylinders as a means of squaring the boxes on the two sides of the engine, because of the ease with which these lines may be knocked out of proper adjustment. The use of the fishtail tram is preferred in some cases for this reason. Although the proper laying out of shoes and wedges is necessary to prevent cut driving wheel flanges, there are other causes for this trouble. Where it exists and difficulty has been found in locating the cause, it will often be disclosed by calipering the tires. On the El Paso & Southwestern, where considerable trouble has been experienced from cut flanges due to track conditions a water rail washer is being used with success. Water is piped from the boiler to points in front of the leading truck wheels and back of the rear drivers, so that it is delivered to the head of the rail. The use of this device has proved more successful than flange oilers in reducing cut flanges and in keeping engines on the track on certain mine branches.

#### CLASSIFICATION OF LOCOMOTIVE REPAIRS

C. S. Williams, shop superintendent of the Pere Marquette, described the classification in use on that road as follows:

Repairs are based upon a certain assigned mileage, the number of miles the engine is expected to make being regulated by the class of the locomotive and the service in which it is used. The following table shows the assigned mileage according to the service and class of locomotive:

Class	Service	Assigned mileage	Gets flues if needed on
4-6-2	Passenger	125,000	100,000
4-4-2	Passenger	90,000	80,000
4-6-2	Freight	75,000	65,000
4-3-0	Passenger	75,000	65,000
0-6-0	Switch	75,000	65,000
2-8-2	Freight	60,000	50,000
2-8-0	Freight	60,000	50,000
2-6-0	Freight	50,000	45,000

The classification of repairs to engines is as follows:

*Class A*—New boiler and general repairs to machinery and tender.

*Class B*—New firebox and general repairs to machinery and tender.

*Class C*—One or more new firebox sheets with renewal of tubes and general repairs to the machinery and tender.

*Class D*—Renewal or resetting of a majority of tubes and general repairs to the machinery and tender. This class to include cases where boilers or fireboxes are repaired, but no entire new sheets applied.

*Class E*—Where locomotives have tires turned or partial renewal of tubes or both together with light repairs to machinery and tender.

*Class E-F*—Repairs to the machinery and tender similar to *Class E* repairs made necessary on account of breakage or failure of some important part of the locomotive not due to accident or collision, where tires may not need turning or tubes require partial renewing.

*Class F*—Slight repairs to the machinery and tender.

Accident repairs are classified under the letter indicating the approximate cost corresponding with the necessary repairs given the locomotive. The report of such accident repairs shows the classification letter assigned on the above basis with the prefix "Acc."

It is impossible to give the costs of the various repairs as classified above, due to the fact that the classification letter of repairs covers all classes of locomotives receiving that repair; however, the shops are allowed a repair credit if the total cost of such repairs, labor and material inclusive, costs over \$25. Any repair work that costs more than \$1,000, regardless of class of locomotive or class of repairs, is itemized on a form used for that purpose and authority is obtained to make the repairs, unless the engine to be repaired has made the mileage assigned according to the table above.

When an engine is due for the shop the road foreman of engines makes a report showing the repairs needed. This is sent to the shop when the engine is taken out of service and advises the man in charge at the shop just what is to be done when the engine arrives for repairs. When the engine arrives at the shop it is examined and if the assigned mileage has not been made an itemized report of the repairs needed is made up and authority is asked to make the repairs. This statement must show the cost of the repairs.

W. W. Scott, general foreman of the Delaware, Lackawanna & Western, described the classification of repairs used at the Buffalo terminal of that road as follows:

*Class No. 1.* Rebuilt.

*Class No. 2.* New firebox and general repairs to machinery.

*Class No. 2A.* New firebox sheet or sheets and general repairs to machinery.

*Class No. 3.* General repairs to machinery to cost \$500 or over.

*Class No. 4.* Repairs to machinery to cost \$100 to \$500.

*Class No. 5.* Light repairs, labor to cost \$50.

It will be noted that full credit is given for all classes of repairs made at shops or enginehouse terminals. The light repair classification is often done at enginehouses without calling upon the back shop for labor assistance and the forces so employed receive credit for output and the work is not chargeable to running repairs.

It has been my experience on other railroads to handle light repairs in enginehouses with the regular force where the cost has run up to \$350 and no output credit given for the operation. It does not seem fair to charge such an amount to running repairs. The cost of enginehouse expense should include only such expense as is necessary to maintain a locomotive in a safe and revenue producing con-



dition ready for service after reasonable detention at the enginehouse for repairs, grooming, coal, water and inspection.

In order that the mechanical department may obtain complete information relative to the condition of the power and the amount of service it is possible to obtain from each engine before the shopping period, the master mechanic calls a meeting each month of the general foremen, the general boiler foremen, the boiler inspectors, the division roundhouse foremen, the road foremen of engines, the traveling foremen and the chief clerks, all of whom come prepared with detailed information on each locomotive in general and its appurtenances in particular. A medical doctor is no more critical in his diagnosis of a patient's condition than is the mechanical department in determining the condition of its locomotives. After these reports have been received the locomotives are divided into six classes, as follows:

Class 1 locomotives are serviceable for a period of 9 to 12 months.  
 Class 2 locomotives are serviceable for a period of 6 to 9 months.  
 Class 3 locomotives are serviceable for a period of 3 to 6 months.  
 Class 4 locomotives are serviceable for a period of 1 to 3 months.  
 Class 5 locomotives are in the shops at Buffalo.  
 Class 6 locomotives are locomotives belonging to the Buffalo division in the shops at Scranton.

From this engine condition report the proper classification of the repairs is given to each engine before it enters the shops. The department foremen are given a copy of this report so that each one knows what material will be needed when the engine does come into the shop, and the storekeepers are advised as to the material that will be needed. Every mechanical foreman has a convenient and intelligent report of the condition of each locomotive on the division, and there is no occasion to fear the inspection of the Federal and State authorities.

*Discussion.*—From the discussion of this report it appears that there is a wide diversity in the methods of classifying locomotive repairs used on different roads. The methods outlined in the report are those most generally used, but on some roads repairs are divided into as high as 12 or 14 different classifications.

#### RELATION OF FOREMEN TO MEN

T. E. Freeman, Duluth & Iron Range.—There are two very important factors in getting out work: First, the man's ability to do the job. Second, his willingness to do it. To get the best results, the foreman should be in close touch with his men. Study, if possible, the character and disposition of the men. This will help in distributing the work to the best advantage. Nationality, religion, politics, or personal friendship should have no place in the shop. All men should be treated the same. The foreman should be firm, but kind and just, letting his men know what he wants and what is expected of them. Never countenance or encourage talebearing. A foreman's character should be such as will appeal to his men in everything that stands for good, pure and upright manhood. When orders are issued it should be seen that they are obeyed. If at any time it is necessary to correct or call any of the men to account for neglect of duty, do it privately, never publicly or while angry. Never swear at the men. To punish or make unkind remarks to men in the presence of others, lowers the standing of the foreman in the estimation of the men, and nothing will be accomplished.

In answer to the question: "Should a foreman be a 'leader' or a 'driver'?" some may say, it is necessary to be both, for there are men who have to be driven, as mules are driven, in order to get them to work. I do not agree with this assertion, first, because I do not believe it is in harmony with human nature, and, second, I do not believe it is true. The very essence of good foremanship—as of good leadership—is co-operation. Men like to work with—not for—a man who shows some regard for them, who is fair with them, who is thoughtful for their welfare. And where men like to work the best results are obtained. The swearing, driving foreman

has no place in modern efficiency. Modern methods are to get the best out of workmen by bettering the men themselves.

The foreman who is a leader, who possesses and exercises the essentials of leadership, will have a loyal and, usually, efficient following. His men will be with him rather than under him. They will do their best for him because he does his best for them. They will respect him because he respects them. They will be fair with him because he is fair with them. They will advance him because he advances them. And in thus treating his men he puts himself in the surest way for still wider and more important activities, for a still higher and more responsible trust.

The foreman who is a "driver" must keep on driving to get results. He cannot expect loyalty, for loyalty comes voluntarily; it cannot be compelled. He need not look for co-operation because his methods arouse antagonism. He must remain always back of his men rather than have his men back of him. As a "driver" he is likely to be kept on the lower levels where driving is supposed to be needed. His methods are most likely to stand as an effective bar to his own advancement. The leader is always at the head of his men. The driver, of necessity, must remain in the rear. When opportunity for advancement comes the man in front has the first chance. The same friendly relations should exist between the foreman and his men as between the master mechanic and the foreman.

Lack of attention to details by foremen is a contributory cause of mental disturbance in employees, which in turn interferes with their capacity for production. I refer particularly to the failure of foremen to interest themselves in the matter of conveniences for employees in the handling of their work, as well as providing for their bodily comfort. It is a common condition in many shops to find employees trying to make headway with defective tools.

Great claim is generally laid on the importance of a large shop output, the common basis of measurement being the number of locomotives a month which can be repaired in a given shop. The ability of a foreman to increase the output of a shop is very commonly used as an indication of his value as a manager. No doubt this is a reasonably good method of arriving at an estimate of a man's ability; but there is a question of the advisability of using this as the only basis for arriving at such an estimate. Quantity is desirable and even essential in shop output. Economy demands that locomotives spend as large a proportion of the time as possible in earning money, which means that they must spend as little time as possible undergoing repairs. But there is more to the repair question than the heavy repairs made in the back shop. Most locomotive repair work is done in enginehouses and it is at this point that the effect of laying too much stress on general repair shop output or quantity with a neglect of the quality of the work done makes itself most directly felt.

There are many shops in this country which are rated entirely on the number of locomotives turned out per month in determining the output, when the railway company would be money in pocket if the output were reduced as far as numbers are concerned and steps taken to materially improve the work turned out. If the little things are not done in the general shop they will have to be done in the enginehouse and they may develop into larger things that will compel the return of the engine to the general repair shop long before it has made its full mileage. This is a matter which demands serious attention from higher railway officers as well as shop superintendents and foremen. The maximum possible output of any shop is desirable provided it can be accomplished by the highest quality of workmanship. Quantity without quality will invariably result in increased maintenance charges and decreased mileage between shop-pings; quantity and quality combined will tend toward economy in locomotive maintenance and train movement.

There is wide opportunity for economy in bringing railway men in general and shop employees in particular to

realize that time and material which they can save in their personal work can have a direct and considerable bearing on the condition of the company's treasury and consequently on their own prosperity. While means should be taken to instill these ideas into the older employees, the place for the most earnest efforts is in the apprentice school, and in this connection the simpler the explanation can be made the better. In many instances the lesson will be kept in mind and while it seems a hopeless task to bring all employees to a correct understanding of such matters, a continued process of education and enlightenment will result in a surprising increase in the efforts of individual employees toward economy.

**Discussion.**—One of the difficulties which confront many general foremen today is the handling of foreign labor. It has generally been the practice to work the various nationalities in gangs by themselves, but this has often led to a shortage of labor owing to the difficulty of keeping sufficient men. If one man became dissatisfied it was not unusual for an entire gang to quit in a body. In shops on two different roads, each confronted with the problem of handling several nationalities, this trouble has been solved by breaking up the solidarity of the gangs and mixing the various nationalities. Some trouble was experienced in putting the change into effect, but after the practice had been established no further difficulty was experienced in keeping men.

#### OTHER BUSINESS

The following officers were elected to serve for the ensuing year: President, L. A. North, Illinois Central, Chicago; first vice-president, W. T. Gale, Chicago & North Western, Chicago; second vice-president, J. B. Wright, Hocking Valley, Columbus, Ohio; third vice-president, George H. Logan, Chicago & North Western, Clinton, Ia.; fourth vice-president, W. H. Warner, New York Central, Elkhart, Ind.; secretary-treasurer, William Hall, Chicago & North Western, Winona, Minn.; chairman of the executive committee, E. E. Griest, Pennsylvania Lines, Ft. Wayne, Ind.

The by-laws were amended to make the office of secretary-treasurer permanent instead of elective annually.

The following are the topics for consideration at next year's convention: (1) Engine Failures, Their Causes and Responsibility, and What Constitutes an Engine Failure; (2) Methods of Meeting the Requirements of Federal Inspection Laws; (3) Alinement of Locomotive Parts to Insure Maximum Wear, and (4) What Interest Has the Locomotive Foreman in Car Matters?

#### TRAIN DESPATCHERS AS OFFICERS

W. H. Smith, a train despatcher on the Virginian Railway, beginning his letter with the query, What is a train despatcher, an officer or merely an employee, or a cross between the two writes to answer this question, as to his own road, with the information that since March 3, by an order recently issued, the despatchers on the Virginian sign their own initials to all train orders. The order making this change was accompanied by a letter, saying, in part:

"The principal object in taking this step is to give proper recognition to the fact that the train despatcher is acting in an official capacity for the company insofar as is consistent with his duty. While it may not have been generally understood by the despatchers that they are part and parcel of the official family, we have always intended that they should consider their relations were such with the company.

"We fully realize that to a very great extent indeed the success of the division is dependent on the faithfulness, ability and intelligence displayed by the chief and the regular train despatchers in carrying on their work, and we desire to have it fully understood by them that their responsibility is recognized and their work appreciated."

Continuing, Mr. Smith says:

"The effect of this should be two-fold. The despatcher, issuing orders on his own authority, may naturally be expected to exercise a greater degree of caution as to the ultimate effect of such order, since he would be held to a more rigid accountability in case of miscarriage or bad results. He should realize that his work is more subject to criticism, properly placed, when his own name is affixed to an order, rather than criticism made at random and directed at no one in particular.

"The Virginian grants its despatchers a vacation of fifteen days each year, and encourages their attendance at the annual conventions of the Train Despatchers' Association by allowing them their expenses while thus engaged. One despatcher from each division makes a trip over the line each month without loss of time and with expenses paid. The trip is usually made in company with other local officers on what is known as the supply train. This train stops at all stations, and frequently between stations, so that it is particularly adapted to investigating purposes."

The following letter concerning the status of despatchers on the Northern Pacific is reprinted from the Train Despatchers' Bulletin for March. It is addressed to superintendents and is signed by M. H. Clapp, superintendent of telegraph, with the approval of the two general managers.

"ST. PAUL, Minn., Jan. 28, 1916.

"The following suggestions and instructions are intended to cover briefly the subject of the proper treatment of despatchers and the matter of handling the promotions, changes and laying off of despatchers, all with the view of improving present conditions both from the standpoint of the company and the men. It is felt that in times past some of our despatchers have not been treated with proper consideration and that injustice has been done to them by employing men from the outside, both in making promotions and filling the positions of trick despatchers when there were available men in our employ or men whom we had recently laid off. In general, there appears to be a tendency on each division to consider the division as a unit without regard to the available despatchers on other divisions.

"Despatchers should be treated as officials in fact as well as in theory; they should be ranked more than mere employees; they should be given every practicable consideration relative to transportation, both railroad and Pullman; when traveling on the business of the railway company they should be allowed reasonable unlimited expense accounts; they should be allowed every opportunity to explain mistakes and errors that may arise in connection with their work, and, finally, they should be allowed the privilege of resigning in case it is necessary to relieve them from the service.

"When making promotions or adding to the despatching force, it is desired in the future that each superintendent consider all the despatchers employed on the system and despatchers who may be working extra or laid off temporarily. I am arranging to keep in my office at St. Paul a list of all the despatchers at present employed or on the extra list, the names to be arranged according to the dates of employment, and will on request make suggestions to the divisions as to men available and eligible. Please advise Mr. Johnson, Superintendent of Employment Bureau, and myself promptly, by telegraph if necessary, of despatchers who are being laid off and available for use on other divisions.

"It is believed that the foregoing plans, if properly carried out, will serve to make the despatchers more satisfied and contented. . . .

"I also desire to ask that this matter be discussed thoroughly with the chief despatcher and by him with the despatchers, so that the general plan that we have in mind will be generally known and appreciated."



## THE EMPLOYEES AND FEDERAL VALUATION

The August issue of the Baltimore & Ohio Employees' Magazine contains an article describing the manner in which the employees of that road can assist the valuation department in gathering data of use in preparing for the federal valuation, particularly with reference to hidden quantities and methods of handling work in the earlier days. This statement is abstracted below.

It is most important that this valuation be accurate and show the true value of the property, but there are many items of property and elements of cost that are not visible, or are forgotten or unknown. Our road will have a representative with the Government party, whose duty it will be to point out these hidden items, so that they may be valued.

The newly organized valuation department is charged with the duty of gathering and classifying this information. In order that no fact of importance may be overlooked, information is requested from officers and employees having a personal recollection of conditions attendant upon the construction, improvement or operation of the property such as abandoned lines and property of every description; streams and roads that are changed; temporary bridges and trestles built to accommodate traffic during construction; trestles, culverts and drains that have been filled or covered up; sink holes and slides; wells dug and abandoned for any cause; expensive foundations of bridges and buildings; drains or other improvements built on farms or adjacent property by the railroad company; wet, sticky or otherwise troublesome material in cuts during construction; rock in cuts disintegrated or covered up so that it looks like earth, or other items such as those in the list that follows.

Names and addresses of contractors or of any other persons (whether employees or not) who can give valuable information are requested. Here is a chance for some of our veterans to render the company a valuable service by telling what they know of the construction and early operation of our railroad. A partial list of items about which information is desired follows:

Note books, maps, profiles, plans and records of construction, final estimates, vouchers, reports of engineers, "authority for expenditure" reports or similar records in the offices of the company, in the possession of contractors or others, whether or not in the employ of the company.

Surveys made before or during construction.

Requirements and expenses in the acquisition of right-of-way, such as drains, cattle passes, bridges or other improvements built or grading done on adjacent land; bonuses paid in addition to deed consideration; consideration for abandonment of crossings or relinquishment of other requirements in deed; annual or perpetual passes granted; or other considerations of value not mentioned in deed; transportation and subsistence of witnesses, witness fees, court costs, etc.; and fences or crossings constructed either by provision in deed or otherwise.

Special construction under roadbed embankments through swamps and marshy ground, such as log and brush mattresses, corduroy, etc.

Sink holes, filling or settlement of abandoned mines, embankments that have slid away into rivers or otherwise out of place or slowly sliding or settling embankments requiring occasional refilling.

Slides, washouts, fires, wrecks, injuries to persons, equipment lost or damaged, calamities, etc., during construction.

Hills that have been entirely removed, or hollows that have been filled in grading, either in connection with the roadbed, station grounds or yards.

Unusually difficult materials encountered in grading, not now evident, including frozen material excavated or unloaded. Cuts originally wet but afterwards dried out.

Solid rock, loose rock, hard pan, quick sand, cemented

gravel, or other special classification of materials excavated, especially when such material is not distinctly visible.

Borrow pits, not easily discoverable, from which material has been taken for roadbed or ballast. Waste banks.

Clearing and grubbing originally done that might be overlooked on account of the adjacent land now being cleared.

Special construction for roadbed protection, such as piling cribs, mattresses, rip rap, sea walls, retaining walls, etc., not now visible or easily discoverable.

Changes in highways and roads.

Changes in channels of streams and canals to reduce the number of bridges, to prevent overflow, to make room for roadbed, etc., and dredging in channels.

Temporary tracks, trestles, etc., on account of highway or channel diversions or to take care of traffic during construction.

Buildings, bridges or other structures moved or torn down during construction.

Rock, corduroy or other special material under ballast in cuts or elsewhere or special construction of any kind due to soft material under track.

Materials employed to prevent the formation of water pockets in widening or raising grade or for other purposes.

Materials exceptionally employed in raising track under traffic.

Approaches to grade crossings, over or under crossings or highway bridges not easily seen to be a part of the construction of the railroad.

Streets or structures raised or lowered to obtain greater clearance or for other reasons.

Old excavations filled up.

Rock excavated while adjacent track was in use.

Night work done during construction.

Bonuses to contractors.

Grade revisions where no changes of alignment was made.

Exceptionally long hauls on earth, ballast, etc.

Abandoned roadbeds or other property not easily seen.

New lines or structures begun and not completed.

Construction or improvements on which work was suspended and then resumed.

Extra watchmen, switch tenders, signalmen, etc., employed during construction.

Difficulties and unusual conditions experienced in the construction of tunnels.

Dikes, rip rap, dams and other work on streams for the protection of bridges or rip rap around piers and abutments, which might be overlooked.

Enlargement of government or other levees.

Difficulties and unusual conditions experienced in the construction of old bridges, culverts and buildings, especially in the foundations for the same, as in case of striking quicksand, etc. Cofferdams, caissons, etc.

Foundations of old structures which are of unusual depth or size or contain piles or other forms of construction which would not ordinarily be suspected.

Culverts, drains, conduits, sewers, water pipes, etc., which are not readily discoverable, and especially those built by the company which are outside the right-of-way. Subdrains in cuts and elsewhere which would likely be overlooked.

Wagon bridges, not over tracks.

Water-proofing of masonry.

Preliminary investigations with reference to foundations, test pits, borings, etc.

Foundations or other construction done for future development.

Girder rail or other rail of special weight or section, put in on account of street paving or other special conditions, and not readily distinguishable from ordinary rail.

Materials, originally ballast, which have settled below subgrade.





## THE MANILA RAILROAD

The government of the Philippine Islands, on February 4, took final action in the acquisition of the Manila Railroad Company, and the ownership of the stock is now vested in the government. This transaction has been made necessary largely or mainly by reason of circumstances growing out of financial difficulties encountered, because of the war in Europe, by the contractors who are building the company's new lines.

By an Act of Congress, approved February 6, 1905, the Philippine government was authorized to guarantee the interest on bonds issued by railroad companies which might be authorized by that government to build and operate railways in the islands. The Philippine Commission by an act (No. 1510) passed on July 7, 1906, granted the Manila Railroad Company (chartered in New Jersey) concessions in perpetuity for certain lines on the island of Luzon, including the then existing lines of the Manila Railway Company, Limited (the English company), which had been granted a concession by the Spanish government in 1887. This concession was without guaranty as to interest on the bonds by the government. In 1909 the Philippine government, by act No. 1905, granted the railroad company concessions for further lines, and under this supplemental concession the lines of the company were divided into two systems, designated as the northern lines and the southern lines. On the southern, including all lines south of Manila and a branch line to Baguio, the government agreed to guarantee interest on the bonds at the rate of 4 per cent yearly. The length of these southern lines in operation, according to the last issue of Poor's Manual, was 175 miles.

The Manila Railroad Company, in order to carry on the new construction required by the last mentioned concession, entered into a construction contract with the old Manila Railway Company, Limited. Under the terms of this agreement the construction company accepted the 4 per cent guaranteed bonds issued by the railroad company, at par, and in turn was required to find the money to carry on the new construction.

The new lines were needed for the development of the territory, and, in 1911 and thereafter, the government, to hasten construction, found it necessary to make large loans to the railroad company. But when the great war broke out the construction company, an English concern, found itself unable to raise funds with which to carry on its work; and it was forced to dispose of its property in such a way as to meet its indebtedness or else submit to being placed in the hands of a receiver. Its relations with the railway company were such that a receivership would inevitably be followed by a receivership of the railroad company. The Philippine government therefore had to face the problem of whether it would find greater advantage in taking over the railroad company at a fair valuation or in allowing it to go into the hands of a receiver, with the possible indirect losses to the islands arising therefrom and a possible direct loss of a considerable part of the indebtedness of the railroad company to the government, which would certainly have ensued if the bonds of the railroad company had had to be disposed of under such circumstances.

After mature consideration and extended negotiations between the Governor General of the islands and the railroad company, an agreement for the purchase of the stock of the railroad company was entered into on December 18 last. This agreement was subject to approval by the Philippine Legislature, and this approval was granted by an act (No. 2574) passed on the fourth of this month.

The agreement provides, in substance, that the government shall acquire all the capital stock of the railroad company for the sum of \$4,000,000, 51 per cent payable in cash on the

date of sale, and the balance within eighteen months, with interest at 5 per cent. It further provides that, with the consent of Congress, the maturity of the outstanding guaranteed bonds of the company may be extended twenty years, or until May 1, 1959, and provides a sinking fund for their retirement. This fund is to be met from such funds of the company, if any, as may be available for such purposes, and to be supplemented, so far as necessary, by continuing annual appropriations by the government. The indebtedness of the railroad to the construction company is to be paid in bonds of the railroad company. The railroad company is also required to retire certain outstanding 6 per cent and 7 per cent bonds, for which purpose it is authorized to issue 5 per cent bonds of equal face value, to be secured by first mortgage on the northern lines and a second mortgage on the southern lines, the latter to be subject to the mortgage securing the 4 per cent guaranteed bonds.

The total length of the northern and southern lines is about 500 miles; and the bonds outstanding amount to \$22,621,000. There is some press criticism in Manila of the action that has been taken, and an appeal may be made to the secretary of war, at Washington, to veto the action of the Philippine Government. The criticism is based mainly on the argument that the project is too large; that it is so great a burden as to imperil the credit of the Islands.

## HIGHWAY CROSSING PROTECTION ON CHICAGO GREAT WESTERN

The Chicago Great Western has taken the initiative in a movement of considerable importance in the matter of highway crossing protection. The safety committees on this road have in the past from time to time recommended crossing bells at certain crossings, but at the suggestion of the management they made a general study last summer of crossing bell protection on the entire system, as the result of which recommendations were made and approved to install this year 79 additional crossing signals. The expenditure for these installations was deemed justified on account of the satisfactory experience this road has had with 67 signals heretofore in service. When the installations approved for this year have been completed, there will be a total of 146 highway crossings protected with crossing alarms on this company's lines.

Orders have been placed with the Chicago Railway Signal & Supply Company, Chicago, for these signals, and they are being installed by the company's forces, at the rate of from one to two signals per day. The bell is a "Chicago" style G, 18-in. locomotive type. The signal is equipped with a large double relay box and an illuminated danger sign. The bell is operated by Edison primary batteries, located in the wood lined iron battery box at the foot of the bell pole; the bell pole and the iron box are securely bolted together, making a single unit, thus utilizing the large battery box as the foundation for the signal. The bells in all cases will be operated by 6 volts, but the electric lamps in the signs where power current is available will be operated from special contacts on the relays using 110-volt alternating current.

Many of the signals are located in automatic block signal territory and in such cases "Chicago" style C neutral shelf type relays controlling "Chicago" style B interlocking relays will be used. In isolated cases, style B interlocking relays, with extra front and back contacts operating the illuminated danger signs, are used. The track circuits, which extend 2,500 ft., or more, in each direction from the highways, are fed from caustic soda batteries, located in "Chicago" short battery chutes designed to hold four cells of R. S. A. caustic soda battery.

## ANCIENT L. C. L. FREIGHT HANDLING METHODS\*

By W. L. Campbell

Office of Third Vice-President, Baltimore & Ohio,  
Baltimore, Md.

We handle l. c. l. freight today the same way Pharaoh did. Means for transportation to destination have changed from the ox-cart to the 8,000-ton train, yet we still load and unload with a two-wheeled truck, only a slight variation from the simple roll and lever. Mechanical aids have been tried and found wanting, as in the new M. K. & T. station at St. Louis.

Starting with the receipt of freight at the freight house, we have the two methods of delivery, "lump" and "peddle," the former prevailing in the majority of cases. In very few cities will the teamsters take the slight additional time for "peddle" delivery, a fact which tends to prevent many reductions in station costs. A variation in the "lump" type is the "drop wagon." Here a wagon is driven to the house, the team unhitched and the wagon left to be unloaded at convenience. This, of course, makes for utilization of equipment by the transfer companies, but blocks the doors, increases the congestion of teams, and adds a little more to the station agent's troubles. The best way to eliminate congestion of teams is proper and speedy information as to where wagons shall deliver their contents. If the "lump" system of receiving is in use, quick headwork is required in selecting the door which will give the shortest amount of trucking for the whole consignment. At large stations it has been found profitable to station a man at the driveway entrance, to do nothing but give proper door locations.

Trucking to the car is where all mechanical improvements seem to have failed so far. One installation of telfers trebled the cost per ton and another saves money by lying idle. Electric trucks can only be used in special cases. Practically the same requirements apply here as in the substitution of auto trucks for horses and wagons—long haul, moving a large proportion of the total time, and a full load. Hence in most cases, the two-wheel hand truck easily holds its own. The economical weight of the hand truck is worthy of study in a large station, just as Mr. Taylor considered the weight of the shovel in some of his first efficiency studies. In some instances, four-wheeled trucks can be used to advantage where a large part of the freight is in small packages.

One of the easiest ways to increase the speed of trucking and the size of the load carried is to provide a smooth floor. One station showed a saving by covering the trucking floor with sheet iron, although this is slippery for the men. Proper runs between the cars are essential. An excellent one is made of 3/16-in. iron, slightly bent 6 in. from one end, which prevents the run from slipping where the cars vary in height. Good loading of the trucks by the truck loaders is a cardinal element in securing economic operation.

Many systems of ticketing are in vogue for the reduction of the number of astrays, any of which is good and will serve the purpose if rigidly carried out. The manner of stowage is chiefly responsible for loss and damage. A good stevedore is an artist, with his principal aim in through cars to place the largest tonnage so as to ride without breakage, and in local cars to have everything in station order, each station lot being blocked so as not to fall when the lot in front is removed. A competent man will also save many claims by watchfulness in tearing down and closing cars before departure.

The next factor is transportation to destination. If it is a through car the process is comparatively simple. The chief consideration is for the way car which is handled by the local

freight. Promptness and speed in getting the local freight over the road without overtime solves many of the operating problems on a division. Well loaded way cars are a means to this end. Despite numerous objections from other points of view, members of the local crews riding in the cars between stations and having freight ready and checked at the car door on arrival at stations, will afford a material saving in time as well as furnishing an additional check of the packages delivered. A good conductor will save many dollars by the utilization of the time on sidings at meeting points in transferring freight to make set-out cars. It is almost axiomatic that ten minutes saved early in the run will often mean hours before reaching the terminal.

Cars sent to a transfer station present a special problem. Here the economic operation requires the leaving of the largest amount of freight in the cars. The question of how much freight should pass through the transfer stations rather than use straight cars, is a matter for very accurate cost analysis and is always a bone of contention between the operating and traffic departments. On the one hand we have the greater utilization of equipment, a matter of many times increased value in periods of car shortage, and economy in the cost of operation due to the decrease in the dead weight per ton of revenue freight. On the other hand we have an increased cost of at least 25 cents a ton for transfer labor. Also every transfer means additional liability to loss and damage. Finally, it means later delivery, which becomes a very important consideration under present competition.

This raises the vital topic of loading orders. Arbitrary minima of 5,000 to 10,000 lb. per car seem to fail to meet many cases. The ideal loading order would be an equation in which the local condition values could be substituted with the resultant minimum for the particular case. This would be based on accurate costs of handling per ton to destination and would show just where and how much is the loss or profit in forwarding light cars for traffic reasons.

The problem of the large terminal is to reduce costs. Bonus and tonnage systems of pay speed up the platform force. The use of the "drop truck" and, where shippers permit, of the "peddle" method of receiving from wagons, increase the efficiency of the truckers. Lost motion in the office force can be reduced by a proper study of each man's work. When business is sufficient, organize bureaus; if not, then have the organization so mobile as to allow concentration on the different classes of work as the peak loads come during each day. A daily balance of accounts has reduced the work of the cashier's department. Labor-saving devices are also profitable in the office. Machines with experienced operators turn out twice the number of way bills that can be made out by hand. Adding machines, comptometers and slide rules all show savings where the volume of business is large. To eliminate errors one road in Chicago found that the savings justified the salary of a man who looked over every way bill just before forwarding.

Finally, we come to the human element, the agent. The personal factor enters into station work to such an extent and the mechanical occupies so small a place, that proper selection, training and incentive to show improvement are cardinal points in economic station operation and dealings with the public. Accurate daily cost records in sufficiently small separations to enable immediate notice of fluctuations in any department are invaluable to the agent. One case comes to mind where a large station handles freight at from 21 to 22 cents per ton, because of the personal element of the agent and house foreman, and all modern efficiency systems are unable to show appreciable savings, even on paper, if installed there. So, as originally stated, we handle freight today as Pharaoh built the pyramids, and he might have had a few methods for eliminating O. S. & D.'s.

\*Received in the contest on The Handling of L. C. L. Freight.



# Railway Strike Averted by Legislation

Congress Passes Temporary Law for Eight-Hour Basic Day Pending Investigation by Special Commission

THE threatened strike of the railway train service employees, which had been ordered for the morning of Monday, September 4, was called off on Saturday evening after both houses of Congress had hurriedly passed a bill establishing eight hours as the standard for a day's work and a day's wage for employees engaged in the operation of trains on interstate railways, effective on January 1. The bill provides for the creation of a commission to observe the effect of the introduction of the eight-hour basis and to report to the President and Congress, and also provides that pending the report of the commission and for 30 days thereafter the compensation of the employees for eight hours shall not be reduced below the present standard day's wage; overtime to be paid at pro rata rates.

The bill was passed by the House on Friday, September 1, and by the Senate on the following day without amendment, after the officers of the four brotherhoods of train employees had announced that they would call off the strike only in case the House bill were passed without amendment. Telegrams rescinding the strike order were sent out by the brotherhood leaders about two hours after the bill was passed and President Wilson had promised to sign it; and the bill became a law with the affixing of the President's signature on Sunday morning. The railroads which had declared partial embargoes in anticipation of the strike rescinded them either just before or just after the passage of the bill.

To avoid any question of the legality of signing the bill on Sunday, the President signed it again on Tuesday evening.

Of the six recommendations made by President Wilson in his address to Congress on August 29, for legislation to avert the strike and to effect a permanent means of settlement of such controversies, only two were adopted, and the measure as passed was frankly declared to be an emergency measure only. The other proposals made by the President, which were disregarded, provided for the enlargement and reorganization of the Interstate Commerce Commission; for the explicit approval by Congress of the consideration by the Interstate Commerce Commission of an increase in freight rates to meet additional expenditures made necessary by the adoption of the eight-hour day; for an amendment to the mediation-arbitration law to require a public investigation before a strike or lockout may lawfully be attempted, and for the lodgment in the hands of the President of the power to take control of railways for military purposes.

Bills embodying the President's recommendations were drafted by the Attorney General's office and furnished to the congressional leaders, but the provisions above referred to were defeated in committee by the protests of the brotherhood leaders against the compulsory investigation feature and of representatives of the shippers against the idea of increasing freight rates. An amendment exempting from the provisions of the act independently owned railroads of less than 100 miles in length, except switching and terminal railroads, was adopted at the request of Bird M. Robinson, president of the Short Line Railroad Association of the Southeast.

Various amendments proposed on the floor of the Senate after the bill had been passed by the House were defeated, after it had been announced that there was not a quorum of the House in the city and that if the bill were amended in the slightest particular it could not be passed in time to prevent the strike. A strong effort was made by Senator Underwood and others to secure an amendment giving the Interstate Commerce Commission the power to prescribe wages and hours of service for all employees of railways en-

gaged in interstate commerce, but they accomplished nothing.

The text of the bill in the form in which it became a law is as follows:

## TEXT OF THE EIGHT-HOUR LAW

"An act to establish an eight-hour day for employees of carriers engaged in interstate and foreign commerce, and for other purposes.

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That beginning January 1, 1917, eight hours shall, in contracts for labor and service, be deemed a day's work and the measure or standard of a day's work for the purpose of reckoning the compensation for services of all employees who are now or may hereafter be employed by any common carrier by railroad, except railroads independently owned and operated not exceeding 100 miles in length, electric street railroads, and electric interurban railroads, which is subject to the provisions of the act of February 4, 1887, entitled 'An act to regulate commerce,' as amended, and who are now or may hereafter be actually engaged in any capacity in the operation of trains used for the transportation of persons or property on railroads, except railroads independently owned and operated not exceeding 100 miles in length, electric street railroads, and electric interurban railroads, from any state or territory of the United States or the District of Columbia to any other state or territory of the United States or the District of Columbia, or from one place in a territory to another place in the same territory, or from any place in the United States to an adjacent foreign country, or from any place in the United States through a foreign country to any other place in the United States: Provided, That the above exceptions shall not apply to railroads though less than 100 miles in length whose principal business is leasing or furnishing terminal or transfer facilities to other railroads, or are themselves engaged in transfers of freight between railroads or between railroads and industrial plants.

"Sec. 2. That the President shall appoint a commission of three, which shall observe the operation and effects of the institution of the eight-hour standard workday as above defined and the facts and conditions affecting the relations between such common carriers and employees during a period of not less than six months nor more than nine months, in the discretion of the commission, and within 30 days thereafter such commission shall report its findings to the President and Congress; that each member of the commission created under the provisions of this act shall receive such compensation as may be fixed by the President. That the sum of \$25,000, or so much thereof as may be necessary, be, and hereby is, appropriated, out of any money in the United States Treasury not otherwise appropriated, for the necessary and proper expenses incurred in connection with the work of such commission, including salaries, per diem, traveling expenses of members and employees, and rent, furniture, office fixtures and supplies, books, salaries and other necessary expenses, the same to be approved by the chairman of said commission and audited by the proper accounting officers of the Treasury.

"Sec. 3. That pending the report of the commission herein provided for and for a period of 30 days thereafter the compensation of railway employees subject to this act for a standard eight-hour workday shall not be reduced below the present standard day's wage, and for all necessary time in excess of eight hours such employees shall be paid at a

rate not less than the pro rata rate for such standard eight-hour workday.

"Sec. 4. That any person violating any provision of this act shall be guilty of a misdemeanor and upon conviction shall be fined not less than \$100 and not more than \$1,000, or imprisoned not to exceed one year, or both."

President Wilson's efforts to bring about a peaceful settlement of the controversy through personal negotiations with the railway executives and the brotherhood leaders, on the basis of his plan that the railroads concede the eight-hour basic day and that all other points in controversy be postponed pending an investigation by a commission, were outlined in last week's issue, as were the President's recommendations for legislation presented in an address before a joint session of Congress on August 29. The legislative machinery was immediately put in motion to pass a bill as rapidly as possible and the President, through personal visits to the Capitol and conferences with the Democratic party leaders and the chairmen of the committees on interstate commerce of the two houses, exerted his personal influence and kept constantly in touch with the efforts to secure its enactment.

Bills embodying the President's recommendations were considered at a meeting of the Senate Committee on Interstate Commerce on Wednesday, August 30, and it was decided to hold a hearing on the following day at which representatives of the brotherhoods, the railways and the shipping and consuming public should be allowed to express their views.

#### HEARING BEFORE SENATE COMMITTEE

At the opening of the hearing Senator Newlands, chairman of the committee, called attention to the fact that none of the legislation proposed involves compulsory arbitration. "It simply provides," he said, "in case of the failure of voluntary mediation and arbitration, for a government inquiry and a stay of the action of all the parties to the controversy until investigation and report shall be made, leaving them free thereafter to act as they may be advised." He said that the time for legislation was so limited as to preclude the deliberation essential to such important legislation and that the committee trusted that before the conclusion of the hearing the heads of the brotherhoods, "realizing that Congress is about to enter with serious and continuous purpose upon the most important questions affecting their interests, will, by a postponement of the strike, enable Congress to act with the care, deliberation and temperance which the importance of the questions involved demands."

"The present complication," he added, "if carried to its logical results, will involve domestic civil war in the United States, the consequences of which cannot be measured. Thus far no tribunal has been established for the purpose of settling the differences between employers and employees; the whole question has been left largely to the doctrine of force, and the question is whether we cannot by some orderly process of law create a system which will do justice as between employers and employees without resort in any degree to force."

A. B. Garretson, president of the Order of Railway Conductors; W. G. Lee, president of the Brotherhood of Railroad Trainmen; W. S. Carter, president of the Brotherhood of Locomotive Firemen and Enginemen; Warren S. Stone, grand chief of the Brotherhood of Locomotive Engineers, and Samuel Gompers, president of the American Federation of Labor, spoke in behalf of the employees. Mr. Garretson made the principal statement for the employees, saying the organizations had always been opposed to the settlement of such questions by legislation, but that if a settlement could be effected by Congress "it would be considered desirable and have the reasonable aid of both parties." He said that there was no actual sentiment against arbitration in the organizations; that three of them are on record as favoring it, but that their experience "has not made them in love with the prac-

tical results that have come from it." Regarding the proposed legislation, he said that only the passage of the eight-hour law, with a penalty for violations, would effect a settlement of the controversy without a strike, but that no influence could be brought to bear that would induce the organizations to accept what he called "compulsory arbitration." He bitterly criticized the Canadian act, saying it has "made of Canadian workingmen a nation of lawbreakers and has bred a contempt for the law that is a menace to good citizenship." When Senator Newlands pointed out that there was nothing in the proposed bill to require a man to work, Mr. Garretson said that a strike of one man would amount to nothing and that the brotherhoods would never accept until compelled to a law "to make the combination of men for the purpose of self-defense a criminal act until it has been investigated." He said that in Canada employers had used the period of investigation to prepare for a strike and had then refused to abide by the award, having already procured strikebreakers.

In giving an explanation of the demands of the men, Mr. Garretson said: "The charge that has been made by the other side that it was impossible to put in a true eight-hour day on a railway is correct. It cannot be done. The trainman cannot stop, because eight hours may find him in a semi-desert country, or find him 50 miles from his home; therefore, he is compelled to go on and work; but he demands a higher rate of speed."

Mr. Gompers spoke at length on the subject of the eight-hour day, saying the American Federation of Labor had endorsed the demands of the train employees, and he was especially vigorous in his opposition to "compulsory arbitration." He said such a law would make strikes criminal, but that it would not stop strikes "when strikes are necessary."

W. G. Lee outlined the negotiations with the President, saying that when no definite proposition was received from the railways after 10 days' consideration of the President's plan the 600 general chairmen had returned to their homes with sealed instructions for the calling of the strike unless they received a message saying "satisfactory settlement reached"; that the passage of the eight-hour law would be regarded as "just about what the President offered" and that no power on earth could stop the strike except a message saying that a satisfactory settlement had been reached on that basis. He said the brotherhoods had conceded a great deal in agreeing to postpone the demand for punitive overtime, because "those who are honestly complaining of their long hours" would rather have time and one-half after ten hours than an eight hour day. Asked by a member of the committee whether the bill would in any way limit the hours of labor, he said:

"Oh, it cannot. Without the time and one-half for overtime we will probably be up against exactly the same condition under the eight-hour or 12½ mile speed basis that we are today against under the 10-mile hour speed basis."

W. S. Carter put into the record a series of articles he had written regarding the demands of the employees and a list of roads that have an eight-hour basis in part of their service, saying "none of them has been wrecked by it." He said he had long been an advocate of arbitration, but that he had had a change of heart. "After years of experience under arbitration," he said, "I have reached the conclusion that a labor question is not arbitrable if the working men hope to secure justice in the results. I have discovered that anything that pertains to workingmen's wages or working conditions is purely a class question, a question on which there is an alignment hard and fast, and that whenever a man rises to that stage of industry where he has the ability to hire another man he loses all sympathy for the working people. Arbitrators are necessarily selected from the master class, that class which either takes its profits from the labor of others or else is employed by corporations in the capacity of offi-



cer or attorney. You may as well select Mr. Gompers as a neutral arbitrator as select people usually selected as arbitrators."

W. S. Stone discussed the working conditions in freight service, saying that while the engineers on the passenger trains that brought the witnesses to the hearing from Chicago only worked three or four hours a day, "100 freight men who had been on duty anywhere from 12 to 25 hours were struggling to clear the way for the limited." He said that the men engaged in freight service are "practically slaves."

R. S. Lovett, chairman of the Union Pacific, spoke on behalf of the railway executives, emphasizing the fact that the controversy involves not only the railways and their employees, but the public. He gave some figures showing the diversified ownership of railway securities and declared that the bankers have not attempted to dictate the position of the railway executives. He had received but one communication from any banker since he had engaged in the controversy and that was to advise him to accept the President's proposals as the easiest way out of the difficulty. Whatever expense is incurred by the increasing of wages, he said, will be ultimately paid by the public, and the \$60,000,000 which the eight-hour day would add to wages would appropriate at once the power to pay 5 per cent on \$1,200,000,000 with which to develop the railroads of the country. Moreover, this sum would not go to the men who work the longest hours and do the hardest work for the least money, but to the best paid men in the service. Such an important question the railroads felt should be decided by arbitration, after careful study by some impartial tribunal, and the roads have offered to submit it to arbitration under the Newlands act, to the Interstate Commerce Commission, or to any commission that the President of the United States might appoint. He said that if Congress proposed to forbid the employees to work more than eight hours they would be up in arms against it.

"A great many of us feel that we have no right to surrender," he said in conclusion. "This question is up to the government of the United States. If Congress declares that their demands shall be accepted; if, under this menace that now confronts the country, Congress sees proper to surrender without inquiry to these four men and put upon the commerce of the country \$60,000,000 of additional cost, that is Congress' affair and not ours. We do not believe it should be done and we do not believe it is necessary to do it. I do not believe the people of the United States will ever stand for any system that permits four men, whether they be Wall Street men or any other men not chosen by popular vote, to have it within their power to paralyze the national life. I feel that this problem has passed beyond my hands. I feel that it is a national problem. We have done our utmost to solve it. Whatever Congress sees proper to do about it, of course, we must abide by it. If Congress wants us to take on this burden it must say so. My judgment is that it would be a great injustice."

Elisha Lee, chairman of the National Conference Committee of the Railways, explained some of the technical features pertaining to the demands and to the estimates of the increased cost, which, he said, had been calculated by applying the demands to the actual payrolls for October, 1915. He also described briefly studies that had been made of various methods of operation under the proposed schedules, which had resulted in the conclusion that it would be more economical to pay the overtime demanded than to increase the facilities sufficiently to enable a speed basis of 12½ miles an hour to be maintained. The committee had asked the roads in the movement to compile statements for the month in which they had had the largest number of cases of service in excess of 16 hours a day, which had showed that of 586,920 freight trains, .3 of 1 per cent had exceeded 16 hours on the road and 1.3 per cent were tied up to prevent violation of the law. In reply to statements made by the other side regarding the number of roads that have an eight-hour basis, he said that

about 85 per cent of the service in the country is on a speed basis of 10 miles an hour.

J. M. Sheean, counsel for the conference committee, said that there is no railroad schedule in the United States that has the eight-hour day which the bill provides for, that on only one railroad, the New York, New Haven & Hartford, is there an eight-hour day in yard service, and that on that road the men in eight-hour yards receive eight-tenths of the pay of the ten-hour men. He said that the railroads had felt the problem too big a one to be settled privately and that Congress was now faced with the same problem which had confronted the railroads, as to whether it should add \$60,000,000 to the transportation cost of the country without investigation. Asked by the chairman how much it would cost to extend the eight-hour day to all railway employees, he said that it had been roughly estimated at \$250,000,000 a year.

A. P. Thom, counsel for the Railway Executives' Advisory Committee, said that if Congress proposed to legislate on the subject in the present emergency all of the recommendations of the President should be included, not merely parts of his program. "We do not demand the right to determine this question," he said, "we do not think that any other interested party ought to claim the right to determine the question. We think it ought to be determined by the enlightened consciences of impartial men. We were told that an eight-hour day was not an arbitrable question. We answered that these gentlemen would not accept an eight-hour day if it was tendered to them. Every eight-hour day which has passed under the review of the judgment of this country has had a humanitarian object and has not been regarded as a means simply of increasing wages for hours that should remain unchanged."

Representatives of some of the principal organizations of shippers urged Congress to avert a strike, but not at the expense of the shippers, saying there should be a full hearing before the cost of additional wage increases should be added to freight rates. Among those who testified were E. H. Goodwin, general secretary of the Chamber of Commerce of the United States; H. C. Barlow, traffic director of the Chicago Association of Commerce; W. E. Lamb, representing a number of western shippers; Luther M. Walter, attorney for the National Industrial Traffic League; Thomas Creigh, attorney for the Chicago Association of Commerce; R. S. French, general manager of the National League of Commission Merchants; James A. Emery, representing the National Association of Manufacturers; H. G. Wilson, chairman of the legislative committee of the National Industrial Traffic League; Frank Lyon, a traffic attorney, and James L. Cowles.

Mr. Goodwin, for the Chamber of Commerce of the United States, presented recommendations that Congress do two things and no more: First, provide immediately for a prompt, thorough and impartial investigation of all facts relevant to the controversy, and second, command the brotherhoods and the railroads to suspend all action in the nature of a strike or lock-out pending such an investigation. Mr. Barlow urged that both parties be required to "lay their rights on the table" pending an investigation, and also that consideration be given to the question of what freight rates should be affected by any increased expense. "How much will the state of Iowa pay?" he asked, "the state of Ohio, the state of Illinois; or shall we create and perform an undue discrimination in favor of those states and tax 70 per cent of the Interstate earnings of these companies, exempting the passenger traffic? Let the people of the country know who must foot these bills. Let us have our day in court as well as these honorable gentlemen and the railway carriers."

B. M. Robinson, president of the Short Line Railroad Association of the Southeast, said that about 110 of the 125 members of his association are independent lines that were not involved in the controversy, because their men had not presented demands, but that the bill as proposed would seri-

ously affect them. He said that most of the train and engine employees on these roads are men who have not had the experience necessary to qualify them for trunk line work and who are not worth and do not demand the standard rates of pay.

H. L. Clark, representing the American Electric Railway Association, asked that a distinction be made between steam and electric railroads in the proposed law.

While the hearing was in progress, President Wilson conferred with the brotherhood leaders at the White House and urged them to recall the strike order. It was stated, however, that they would give him no definite assurance.

#### PROCEEDINGS IN CONGRESS

On the same day Representative Adamson, chairman of the House Committee on Interstate and Foreign Commerce, introduced in the House a bill, H. R. 17,700, substantially in the form in which it was finally passed, and a special rule was adopted providing for a vote on Friday.

Following the hearing on Thursday, which lasted for nine hours, the Senate Committee on Interstate Commerce held an all-night session and on Friday morning reported a bill, S. 6981, including the provisions for an eight-hour basic day and for an investigation by a commission, but omitting the sections recommended by the President referring to freight rates, providing for the reorganization of the Interstate Commerce Commission, for a compulsory investigation in advance of a strike or lockout, and for giving the President power to take over railways for military purposes. As reported the bill included a section providing a penalty for "any person who shall wilfully delay, obstruct or hinder the operation of trains" and a section giving the Interstate Commerce Commission power "to fix the hours of labor and prescribe just and reasonable wages for all employees" of railroads in interstate commerce, the wages and hours provided for by the eight-hour section of the act to remain until changed by the decision of the Interstate Commerce Commission within a period of from 6 to 12 months. The commission was also given power from time to time to change the hours of labor and the rate of wages "either on its own initiative, on the petition of the employees, the managers of the railroads or of the public."

Under the special rule the Adamson bill was discussed in the House on Friday and was passed in the afternoon at 4:30, having been amended only in minor particulars. The effective date was changed from December 1 to January 1, and electric street and interurban railways, and independent roads less than 100 miles long, except switching and transfer roads, were exempted. The bill was passed by a vote of 239 to 56. Only two Democrats voted against it, but 70 Republicans voted for it. During the debate, in which many of the representatives protested that Congress was being coerced into passing the bill, the brotherhood leaders occupied a committee room just outside the Chamber and were in constant communication with the advocates of the bill.

The Senate took up consideration of the bill introduced by Senator Newlands, chairman of the Committee on Interstate Commerce, on Friday afternoon, but in the evening, after the bill passed by the House had been received, unanimous consent was obtained for the substitution of the House bill. Senator Underwood immediately proposed as an amendment the section giving the Interstate Commerce Commission power to fix wages and hours. Most of the evening session was taken up with debate on this amendment and a long speech by Senator Cummins criticizing the entire plan. Senator Newlands supported the Underwood amendment, criticizing Congress for not being willing to support the President's entire legislative program, and agreeing with Senator Underwood that the section giving the commission power to regulate wages was needed to afford some permanent means of settlement of wage disputes. He said that

the section was favored by the committee and that he favored it "because it does something in the way of preserving the general balance of legislation which the President sought to insure."

Senator Cummins opposed the amendment on the ground that it would take away from the employees the right of collective bargaining, and also on the ground that it would not prevent the strike, saying that the brotherhoods would not accept it. He also opposed the bill as the "brassiest gold brick that was ever tendered the people of the United States." "In its title," he said, "it is not only misleading, but positively false. It does not establish an eight-hour day; it has no tendency to establish an eight-hour day. Instead of having a tendency to shorten the hours of labor its tendency is to lengthen the hours of labor." He said he was in favor of an eight-hour workday, but that the bill merely advances the wages of the trainmen for a short period, without investigation, and that there were serious doubts as to its constitutionality. He had proposed to the committee a temporary measure designed to meet the emergency by creating an investigating commission and suspending the power to strike pending the investigation, but no one had voted for this measure.

The debate in the Senate was continued nearly all day Saturday, under a unanimous consent agreement providing for a vote at 6 o'clock. The Republican senators at a caucus had agreed not to obstruct the measure, but a large number of them made speeches vigorously opposing it, saying that Congress was being placed in the position of being compelled to "stand and deliver" without adequate consideration, to avert a national calamity. Several of the Democrats spoke in favor of the bill, but most of them referred to it as merely a temporary measure, designed to meet the emergency, and referred to the possibility of reconsidering it when Congress meets again in December. Some senators were of the opinion that if Congress provided a means of settling the dispute, even without conceding the eight-hour day in advance, the brotherhoods would not defy public sentiment by making the strike order effective.

#### VIEWS OF SENATORS

The following quotations from statements by various senators indicate the attitude toward the bill:

Senator Vardaman: "I am opposed to this sort of legislation, but I think that if this measure is passed it will be acceptable to the employees of the railroads and no harm can possibly result to the railroads. It will bridge the chasm and possibly enable Congress to deal intelligently with this question, and save the country the disaster that would follow a strike. I do not care if you call it 'bread-pill therapeutics' or what you say about it."

Senator Borah: "The legislature of this great country sitting here is not legislating according to its own will and according to its own judgment, but by reason of and because of dictation outside of this chamber. We are even told here we cannot amend the bill. We are mere automatons; we are mere registrars of decrees formulated by others."

Senator Hardwick: "The correct way to handle this situation was to permanently refer all questions relating to wages and hours, the terms and conditions of railroad employment, to the Interstate Commerce Commission for regulation by that body. The Congress of the United States is almost literally held up. We are notified that we must require these railroads to make concessions literally under force, under duress, under compulsion, in order to keep these highly organized workmen from absolutely tying up the business and commerce and industry of the Republic."

Senator Sherman: "If we can not rise to a higher level, if we cannot seek to prevent the Chief Executive from bending to petty politics to serve ephemeral purposes on the eve of a presidential election, then we are unworthy of our great



trust. I believe in an eight-hour day. In its essential analysis this is not an eight-hour question."

Senator Underwood: "If you stop with this eight-hour bill, without section 6, you will have a piece of legislation that is merely the purchase price of peace."

Senator Brandegee: "If the government is purchasing its peace for \$60,000,000 a year does not the Senator think it would be honest for the government to pay it out of its own treasury instead of reaching into the treasury of some other persons and having them pay it?"

Senator McCumber: "This bill in no way purports to be the establishment of a limitation upon the hours of labor of anybody anywhere."

Senator Husting: "We are facing a situation that is without parallel in the history of the country. The first thing to be attended to, in my judgment, is to stop that strike. The people are not so much concerned how you are going to stop it so that it be stopped. The other considerations can be attended to later."

Senator Sterling: "The question is as to whether the United States Congress is to be dragooned into enacting a law now before six o'clock. That is the grave question. It is more far-reaching in its importance than the other question, the one relating to the material loss that may be sustained by reason of the trainmen going on a strike. It is as though a highwayman said to us 'Stand and deliver.' I, for one, refuse to be stampeded."

Senator Weeks: "I am convinced that with public sentiment almost completely against this strike, as it would be, that even if it were ordered it would be of short duration and would result in the humiliation of those conducting it. If Congress accedes to this demand, it is, in effect, temporarily at least, an end of representative government and the substitution for it of government by coercion."

Senator McLean: "I am in favor of the eight-hour day where the character of the employment will permit it. It is admitted that the demand is not for regulation of the hours of service but for a raise of 25 per cent in the compensation."

Senator Owen: "I must support the bill because it appears to be the most convenient means by which we can avoid the strike on Monday. It does not meet the true legislative requirements. It is but a poor temporary expedient, but will permit the Congress of the United States to discuss and consider this matter in a broader aspect next winter."

Senator Brandegee: "There is not a line or a syllable of the bill that attempts to prevent anybody from working more than eight hours a day. We regulated the hours of service because that was necessary for the safety of interstate transportation. To what extent a court will go in saying that the regulation of wages is necessary for the safety of interstate transportation remains to be seen."

Senator Gallinger: "The fiat has gone forth and the probabilities are that no effort that we make here against this bill will be successful. It will pass because it has the endorsement and the active support of the President of the United States, who seems to have taken charge of the legislative department of the government."

Senator Kenyon: "I am opposed to this bill, not because I am opposed to an eight-hour day, for I favor that. I oppose it for two reasons. One is that, in my judgment, the bill is a humbug; that it will give these men nothing that they desire. When the period of nine months is up they will be just where they are now, with a strike upon their hands."

Senator Pomerene: "Congress will be in session in December and we will then have an opportunity to take up this question to investigate it, to consider it thoroughly."

Senator Underwood: "I have always voted for an eight-hour day. If it were practicable I would do it in this instance, but there is no eight-hour provision in this bill."

Senator Shafroth proposed an amendment to the Underwood amendment providing that "nothing herein contained

shall be construed as compelling the employees to work at the wages prescribed." Senator Newlands proposed as an amendment the discarded section of the Senate bill making it a misdemeanor to obstruct the operation of trains. Senator Norris offered an amendment providing for eight hours as the standard of a day's work and a day's wage, but giving the Interstate Commerce Commission the power to fix the rate of pay for both officers and employees. Senator La Follette offered an amendment that nothing in the act shall operate to alter the effect of the 16-hour law. While the amendments were being discussed Senator Reed of Missouri announced that Chairman Adamson of the House committee had just told him that if the House bill were amended it would be utterly impossible to pass it; that the absence of a quorum would prevent the consideration of an amended bill in time to prevent a strike.

The amendments were then voted upon and defeated, and at 6 p.m. the vote was taken on the bill, which was passed, 43 to 28. Only one Republican, Senator La Follette, voted for it, and two Democrats, Senators Hardwick and Clarke, voted against it.

The leaders of the brotherhoods occupied a room just off the Senate gallery during the debate, and after the bill had been passed announced that the strike order would not be rescinded until the President had signed the bill. The President was at Long Branch, N. J., too far away to receive it before midnight, but after he had sent a message promising to sign it on Sunday morning the telegrams rescinding the strike order were released at 8:30 p.m. The President returned to Washington for a short time on Sunday morning and signed the bill, using four pens, which were presented to the brotherhood leaders.

Most of the railway officers who had been in Washington conferring with the President on the strike situation left the city on the day he made his recommendations to Congress, for the purpose of making preparations for a strike. One of the first steps taken was to declare partial embargoes in order to avoid congestion when it became necessary to operate with a restricted service. These were rescinded by many roads when it became apparent that Congress proposed to prevent the strike and by others after it had been declared off. In explanation of the embargoes a statement was issued on September 1 from the office of the General Managers' Association of Chicago, saying that the railways were not merely protecting their own interests but that in a larger measure they were protecting the interests of the public, and that if they were causing inconvenience and loss to the public they were causing greater proportionate inconvenience and loss to themselves.

An advertisement was also placed in the newspapers on August 31, explaining the proposition made by the railways for a peaceful settlement of the controversy on the day of their last conference with the President, which was rejected by the brotherhoods. This plan provided for keeping an account of the wages on the eight-hour and on the ten-hour bases, pending an investigation by a commission, the additional pay on the eight-hour basis to be payable as directed by the commission if it approved of the increase in wages. The advertisement was signed by the sub-committee of eight railway executives, with Hale Holden, president of the Chicago, Burlington & Quincy, as chairman, appointed by the railway executives in Washington. Several railroads also published advertisements explaining the position of the railroads in the controversy.

On many roads assurances were received from a large number of their employees that they would not join the strike. On the Union Pacific the engineers had not presented any demands and on several divisions the conductors had announced that they would take no part in the strike. On the Atchison, Topeka & Santa Fe a large percentage of the men declared themselves to be opposed to the strike. One thous-

and conductors on the Chicago, Milwaukee & St. Paul telegraphed Mr. Garretson saying that they would not walk out when ordered, and a delegation of conductors from the Chicago & North Western was on its way to Washington to protest against a strike when the decision to call it off was reached.

The wage controversy continued to be a subject of discussion in Congress on Monday. Senator Lewis made a long speech defending President Wilson's course in reply to a criticism made by Charles E. Hughes in a speech in St. Louis, and Senator Reed of Missouri offered a resolution directing the Interstate Commerce Commission "to investigate and, as nearly as possible ascertain what, if any, increase in the cost of the operation of trains will result from the compliance by the railways" with the eight-hour law, and to report its findings to Congress on the first day of the session in December. The resolution provides that if the commission cannot conclude its investigation by that time it shall report for the railways as to which it has been able to complete its investigation.

#### HISTORY OF THE CONTROVERSY

The wage controversy thus temporarily terminated has been in progress throughout this year. Early in January the executive committees of the four brotherhoods formulated their demands for an eight-hour basic day and time and one-half for overtime in freight and yard service, and early in March it was announced that the demands had been approved by a referendum vote of the membership of the organizations. The demands were formally presented to the railways individually on March 30, and on the same date the railways replied with their contingent proposals for a reopening of other schedule provisions not directly involved in the demands. On April 27 arrangements were made for the beginning of conferences in New York on June 1 between the brotherhood committee and the National Conference Committee of the Railways. These conferences lasted for two weeks, at the expiration of which the railways proposed that the controversy be submitted to the Interstate Commerce Commission or to arbitration under the Newlands law. This offer was refused by the brotherhood leaders and a strike vote was taken. On August 8 the conferences were resumed in New York and the brotherhoods announced the results of their strike vote. The conference committee then proposed mediation by the United States Board of Mediation and Conciliation. The brotherhoods declined to join in the request for the service of the mediators, but accepted them when offered by the members of the board. After five days of conferences with both sides the board announced that it had been unable to effect any agreement, and President Wilson summoned both committees to Washington to confer with him.

The President proposed that the railways concede the eight-hour day, leaving the other questions in controversy in abeyance pending the report of a special investigating commission. This plan the conference committee declined to accept, and President Wilson asked the railway executives to come to Washington. About 60 of the leading railway executives of the country spent nearly two weeks in Washington conferring with the President and endeavoring to have the controversy submitted to arbitration. After the brotherhoods had refused the counter-proposal made by the roads and while the negotiations were still pending the general chairmen composing the brotherhood committee left the city carrying sealed orders for a strike to begin on the morning of September 4.

**COPPER IN 1916.**—It is estimated that 20 leading copper companies operating in the United States, Canada and South America, produced approximately 895,000,000 lb. of copper in the first half of 1916. This is an increase of 299,000,000 lb., or 50 per cent, over the first half of the year 1915.—*Iron Age.*

## SIMPLIFIED FREIGHT STATION ACCOUNTING

By Major Charles Hine

Freight station accounting is one of the most complex processes included in railway administration. It is believed that the application of banking conceptions and practices to station accounting as herein outlined will result in marked simplification and notable savings in station expenses.

There is a story of an old general yardmaster who spent Sunday afternoon with his clerk comparing for accuracy the originals and the carbons of letters and reports turned out on the newly installed typewriter. Perhaps railway men generally have likewise overlooked the possibilities of modern processes of duplicating and recording reports and documents. One purchases from his bank a draft on New York. Thereupon the issuing bank mails a duplicate of the draft to the bank on which drawn. The matching of these two identical components of the same unit is the best possible kind of auditing.

The accounting department of a railway as a clearing house for freight accounts needs to know two fundamental facts: first, how much should the agent remit; second, has he remitted correctly?

The first of these essentials will be met by requiring the forwarding agent to furnish each auditor concerned with a carbon copy of the waybill forwarded, another carbon being retained by the agent for the outbound station record. The auditor on receipt of such carbon will hold it against the receiving agent until the waybill itself is accepted by the auditor from the receiving agent after satisfactory evidence of corresponding remittance to the treasurer. By permitting the receiving agent to hold the waybill until collection is actually made, the necessity for a book account with each agent will be obviated. The auditor's office will contain rooms equipped like a postoffice with racks and compartments of appropriate size for each station's waybills. Floor space is usually cheaper than clerk hire.

The second requirement, that of assuring proper remittance, will be covered by pitching the entire transaction at the receiving station on the expense bill. Waybills and expense bills will be numbered in series and issues charged to agents after the manner of passenger tickets, switching tickets, and car seals. A spoiled waybill and expense bill will be sent to the auditor as is a spoiled ticket. The auditor will thus have a check from the time the blanks are printed. By adopting the manibill system, long in use on the Central of Georgia, and recently introduced on the Pennsylvania, the waybill, the expense bill, and the so-called cashier's stub, as well as notice to consignee and receipt for freight delivered, can all be made at once by the forwarding agent and all bear the same serial number. The copy of the expense bill now in use on most roads as a cashier's stub and as a station record will be made the station record for inbound business.

The agent, his cashiers and collectors, sell transportation in the form of expense bills as does the ticket agent in the form of passenger tickets. At convenient times the corresponding waybills and cashier's stubs will be segregated. At the close of the day's business the unsold expense bills represent uncollected. Normally the auditor should no more worry about the details of the uncollected than should a bank about notes due next month. Only one day can be lived at a time, and under a proper system each day can be made to take care of itself. Abnormal indications can be met by judicious use of traveling auditors. Expense bills receivable and notes maturing are assets which both the auditor and the bank must take into account.

On American railways the traffic department urges the agent to secure new business. If this happens to be secured from a large concern with an established place on the credit list the uncollected of the receiving agent may increase considerably in amount. Whereupon he may receive a snappy



letter from some clerk in the auditor's office complaining of the uncollected. This is not good teamwork.

The agent will close the day's business by adding the un-sold expense bills to obtain the total of the uncollected. The station copy of sold expense bills will be added to balance the day's collections. The agent will then make in triplicate a cash slip showing balance on hand yesterday; collections today; remittance; balance on hand; and total of uncollected. One copy is sent to the treasurer with the remittance, one copy to the auditor with corresponding waybills, and the third is retained as the station cash record.

Where an adding machine is used a copy of the slip from the machine will accompany the waybills to assist the auditor in checking. If no machine is used, the auditor should do his own checking. The theory that money is saved by having the agent do work for the auditor breaks down in the face of the multifarious duties imposed upon the modern agent and the latter's force. Here, again, is shown a lack of teamwork. Station expenses, amounting to something like 4 per cent of gross operating revenue, are charged to the operating department. The auditor has no direct responsibility for operating expenses. His cost efficiency is judged by the payroll of the comparatively small clerical force directly under his control.

The agent having balanced his cash, remitted his money and cash slip to the treasurer, his collected waybills and cash slip to the auditor, will bind the day's cashier's stubs with corresponding receipts for freight delivered in convenient sized volumes for the inbound station record, sectionalizing by days and attaching slip from adding machine, if any, to facilitate future checking. This bound record with station copy of daily cash slip will cover the handling and delivery of freight as well as the collection and remittance of money. The outbound station record will consist of bound volumes of carbon copies of waybills forwarded.

These station records, both outbound and inbound, will consist of first hand, primary data free from errors in transcription and unclouded by the useless balances of perplexing and second-hand abstracts.

The forms rendered obsolete, and whose preparation is both expensive and annoying, will include:

- Abstract of freight received.
- Abstract of waybills received.
- Abstract of waybills forwarded.
- Items of uncollected.
- Station cash book.
- Daily account current.
- Monthly account current.

All statistical reports made by agents should also become obsolete. The work should be done by machines in the auditor's office, preferably from carbon of waybill rendered by forwarding agent and while awaiting arrival of original waybill from receiving agent. Integrating machines have within the last ten years been generally introduced in railway accounting offices. American railways have been about 15 years behind the United States Government in the adoption of integrating machines.

The simplified system of freight station accounting will treat a correction as a waybill received. Instead of a special form of correction suitable special colors of waybills and expense waybills will indicate credits, debits, or prepaid. Each phase being treated as an independent transaction, the integrity of each day's cash balance can be preserved. Normally, a bank does not correct an error by altering the original check or draft. A new document, in the form of a check, draft or charge ticket, is drawn to balance.

Revenue from other sources than waybills will be similarly recorded on a special color of expense bill and reported by rendering to the auditor, without abstracting, the appropriate original or carbon copy of the primary document supporting the transaction.

It is believed that the science of organization and the art

of administration rest upon principles as immutable as the laws of matter. Because of the delightful inconsistencies and amiable failings of human nature more difficulty is experienced in establishing sound precepts for men than for things. Let a correct principle be established for the solution of a major problem and all minor incidentals and collaterals will be found amenable to the same line of treatment. It is claimed that the system outlined, being sound in principle, is workable in practice. True progress is from the complex to the simple. The principle here established is that modern devices for producing primary data render secondary data obsolete. In modern accounting the abstract and the list have no proper place.

## RELATIONS BETWEEN SUBORDINATE RAILROAD ASSOCIATIONS AND THE A. R. A.\*

By Charles Burlingame

President, American Association of Railroad Superintendents.

It is readily apparent that the greatest good to the greatest number can be accomplished by the various subordinate railroad associations working together in the closest harmony, in the promulgation of recommendations to the parent body, the American Railway Association.

Stupendous as have been the achievements of the American Railway Association in the past, its work is as yet only in infancy. Representing, as that body does, the greatest single industry in our national life, the transportation of persons and property, it can be seen what tremendous responsibility is theirs in wisely administering the trust with which they are charged. The interests of the individual railroad must be conserved, and yet each company must give enough and take enough to strengthen the fabric of transportation as a whole. The art of scientific management must be carefully studied and brought to the highest state of efficiency possible to obtain. Standard rules and practices must be suggested, minutely tested, and, having proved worthy, be rigidly enforced. Lasting differences of opinion are only annoying and expensive. These differences must be ironed out by committees, careful of the interests of all alike, and the best practices for the common good adopted and maintained.

I have often pictured the railroad situation in a relationship very similar to the states of the Union, the American Railway Association, with its dignity, conservative yet unalterably progressive, representing the Senate, and the various subordinate organizations representing the House. The simile very aptly illustrates our relationship with the public which we serve and the interests which we represent. As the congressman is closely in touch with the wants and requirements of the constituency which he serves, so are the members of your association, and mine, actively in touch with the needs of the people we must serve, and upon whose good will and prosperity we must depend for the revenues to support the various companies by whom we are employed. As the congressman should be very careful to separate the worthy from the unworthy before drafting bills which may eventually be enacted into laws, lest they be rejected, so should we be very careful to separate the wise from the unwise before presenting recommendations to our superior officers.

At the present time, in my opinion, there are too many recommendations going to the American Railway Association, resulting in about five-sixths of them being discarded by that body. The joint recommendations of our associations should be sound rather than numerous, so the American Railway Association can discern that our associations are well prepared to originate proposals for its consummation. We should eliminate all doubtful issues, having in mind that good recommendations which stand and bear fruit, add laurels to the subordinate association originating and referring them. We

\*From an address at the Twenty-ninth Annual Convention of The American Association of Freight Agents in Cincinnati, Ohio, June 20-23, 1916.

will not gain the plaudits of members of the American Railway Association by referring to that body ill-advised or superfluous legislation. While our associations are marked for higher duties in the future, recognition will come sooner and more surely if we do not send so many recommendations to them.

I have thought and have suggested to our executive committee, that the various subordinate organizations should be financed by the American Railway Association, over and above a nominal membership fee of, say, \$1 per year. The members of your association and mine are devoting their time and energies to the interests of the railroads, and no form of recognition would be more apt to stimulate enthusiasm and increase our possibilities for usefulness than the promise of the American Railway Association to finance our association work. Many of those eligible for membership are deterred by the thought that since our organizations are not so financed that their purposes do not meet with the approval of the executive officers comprising the membership of the American Railway Association. This is, of course, not the case, but, as stated, recognition on the part of the American Railway Association, in the matter of finances would swell our membership to such proportions, and so increase the number of our workers, that the \$1 per year dues would easily take care of routine expenses. I am well aware that some of the individual railroads are paying the expenses of the members of our association, and have been very liberal in granting leaves of absence to members engaged in association work. It is this liberal policy on the part of some of the carriers that has made possible the results which we have heretofore achieved, but our usefulness would be increased if this principle would be adopted by the American Railway Association as a standard practice.

In this connection, just a word in regard to committee appointments. It is important in getting officers and committeemen, while selecting them for high character and talent, that the sanction of their superior officers be obtained to the appointments, so that the men will be backed up with the knowledge that their superior officers desire them to attend committee meetings and conventions and give a portion of their time to the general science of railroading. A few of our higher officers are only lukewarm at the present time on these subordinate associations. Where you find a manager who is so constituted that he frowns on the work of these subordinate associations, then a superintendent or an agent appointed as a committeeman by that road is not going to attend your meetings regularly or make a very enthusiastic committeeman. For the present, at least, until the subordinate associations gain more recognition from the American Railway Association, it is very important that men be selected for committee duty who volunteer for the work, and who know they can attend the meetings. If they do not know, then their membership on committees should be solicited through the general manager, in order to have his stamp of approval. An immense majority of the general managers approve of the work of subordinate associations, but there are some who do not, and who throw cold water on the aspirations of the officers of the subordinate bodies.

Furthermore, I recommend to the agents' association, as well as to the superintendents' association, that the officers and committeemen be kept in office for a longer period of time. With only one or two committee meetings a year, a man hardly gets in practice, he hardly strikes the rhythm of the work of the committee, in one year. With a four years' term similar to that of the President of the United States, and senators and congressmen, the officers and committeemen might be expected to produce more valuable results.

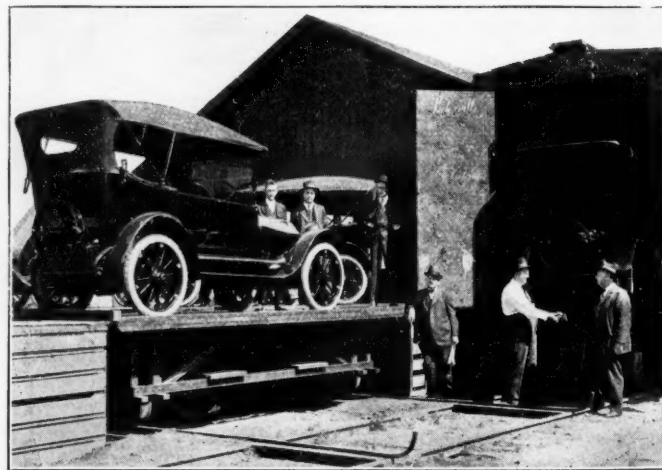
Another thought in connection with committee work. During my term as president of the superintendents' association I have noticed a good many subjects brought up in which the freight agents also had an interest. I believe that

if suitable joint committees should be appointed all subjects requiring concerted action could be referred to these committees and much good result. It might be desirable to extend this plan still further and have the committees enlarged to include representatives from the Train Despatchers' Association. Joint committees seem to me to be very desirable. If approved of the details could be readily worked out. But if the agents' association does not approve of the joint committees allow me to suggest that your recommendations, involving action in operating matters, be referred to the American Association of Railroad Superintendents for its consideration, before being passed to the American Railway Association, a plan which is now followed by the divisions in local matters.

### AN AUTOMOBILE UNLOADING PLATFORM

The unloading of automobiles from box cars has come to be a frequently repeated operation at all freight stations of any size and the character of the facilities provided for transferring the motor cars from the freight cars to the ground is largely responsible for the expense this operation involves. These facilities vary from a pair of skids set against the end of the car, down which the automobile is lowered, to a flat car coupled to the loaded freight car to which the automobile is transferred on its way to the platform, the latter usually being provided with an incline for wheeling the auto to the street. In some installations a stub track is provided abutting on a platform to which the automobile is transferred with the help of a steel plate, bridging the gap between the car and platform.

Another means for accomplishing this operation, and one which overcomes a number of the difficulties encountered with most of the earlier methods, has been introduced at Riverside, Cal., and other points on the Santa Fe. It consists of an application of the rolling milk platform idea, the addi-



Platform Rolled Back Into Recess Ready to Release the Automobile

tional feature in this case being a pair of movable rails which are placed on top of the track rails so that the platform may be moved out directly over the track on which the automobile car is standing.

When not in use the loading platform remains in a recess provided for it in the freight platform of which it forms a part at such times. When it is desired to unload a car the rolling platform is run out over the track in line with the end of the car to be unloaded, a plate apron forming the bridge over which the automobile passes from the freight car to the rolling platform. The platform is then rolled back into place and the automobile is transferred to the freight platform. The scheme was devised by B. J. Simmons, division engineer of the Santa Fe Coast Lines, San Bernardino, Cal., and J. B. Bauman, agent at Riverside.



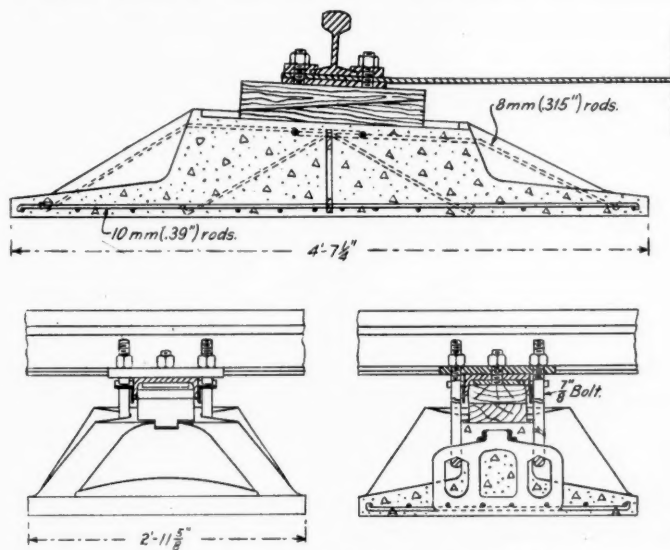
## EXPERIMENTAL TRACK IN HOLLAND

By K. den Tex,

Utrecht, Netherlands.

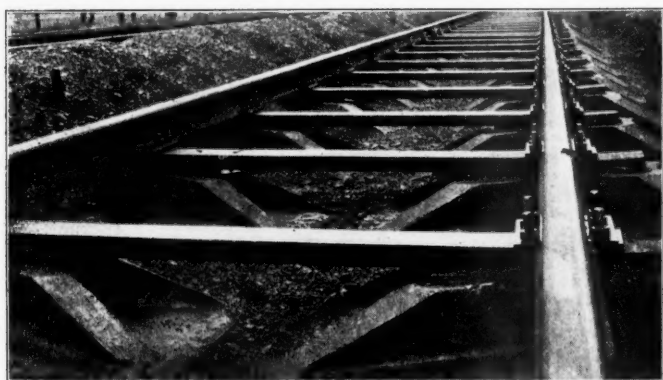
A great obstacle to the use of a reinforced concrete tie is its weight. Many of the designs which have been tried have been found too weak and sufficient strength has been secured only by adding material. But as the ties are already heavy, additional weight is objectionable. One way out of this difficulty is to cut the tie in two.

A tie fulfills a double function. It provides the necessary



Sections Through Concrete Pedestal

base to support the load on the roadbed, and it holds the rails to gage. As a support on the roadbed, reinforced concrete serves very well, but to limit the weight the lateral dimensions must be small. In fact, a round slab or foot placed underneath the junction of the rail and the tie would be the ideal solution. The other function, to hold the rails to gage, can be entrusted to a light tie of steel or wood, which materials, owing to their elasticity, are well adapted to that purpose. A trial track based on these principles has been installed on the Netherlands state railways. This is shown in the accompanying photographs, one of which shows the stretch of track with the ballast removed. The length of this experi-



The Experimental Track with Ballast Removed

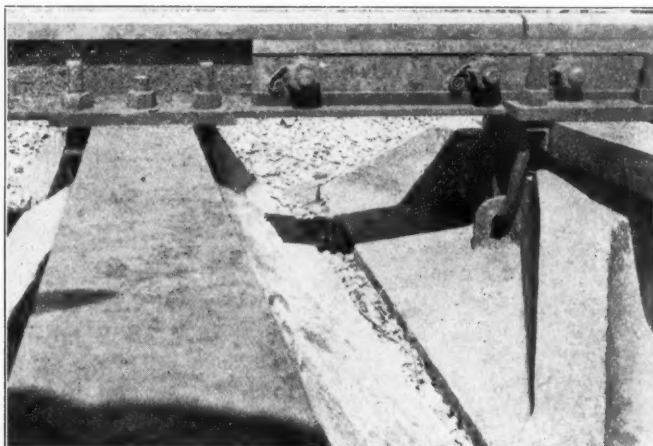
mental section of track is 120 ft. It contains 30 steel ties of channel section, laid flat, reposing on 60 concrete slabs, with the intermedium of an equal number of wooden wedges.

This track was built in December, 1914, in the main line from Utrecht to Amsterdam, which carries a traffic of 50 trains a day. The speed at this location is not fast, as the distance from Utrecht is only a mile, and all the trains stop at this station. After a service of 1½ years, the track is still practically as good as it was when new.

One of the most important observations of this experiment is that the wedges do not work loose. The entire combination of the rails, ties, wedges and reinforced concrete slabs is strongly bound together by V-shaped bolts, which are hooked into the reinforcement of the slabs. The wedges are of hard wood and have an inclination of 1 in 10.

The surface of the track is regulated by adjusting the wedges, the V-bolts being loosened in advance. The track has required very little maintenance work. The ties near the joints, which are laid opposite, have settled about ¾ in. more than the others. Although it was not yet necessary, the pair of slabs under one of these ties was lifted on a layer of gravel which was shoved under them. The tamping of the ballast under the concrete is dangerous for this material and has been avoided.

The concrete has been sufficiently protected against the shocks of the traffic by the wooden wedges and the tight attachments. It does not crumble, but on some of the slabs cracks may be seen across the bottoms of the center openings. The great feature of the track is its rigidity. Its weight including the ballast reposing on the slabs amounts to 1,500 lb. per yard against 600 lb. calculated for the standard track of the Netherlands state railways, consisting of wooden ties and flat cast iron chairs. The weight of one slab is 440 lb. The cost of the track, calculated from normal prices before the



Pedestal at a Rail Joint

war, is \$6.15 per yard as compared with \$5.70 for the standard track.

To keep the cost down to this reasonable amount the spacing of ties has been increased 4 ft. with a 2-ft. spacing of the joint ties. It is judged that rails weighing 92 lb. per yard are strong enough for this spacing if well supported. In fact, as the rail is subjected by the traffic to two systems of pressures, one from above and the other from the reaction of the supports below, there is no reason why the distance of the last-named supports should be so much closer together than the others, represented by the axles of the train.

By exact measurement the strain has been determined in the base of the rail between the supports and it has been found that, although the distance of the supports in the trial track was more than double that in the standard track, the strain was only about 50 per cent in excess.

It is not necessary to carry the concentration of support and attachment as far as it has been done with this trial track. The principal features of the trial are the employment of the wooden wedges and separate slabs under the rails and the depth of the bases of these slabs.

Durability and an easy, but thorough, maintenance of the track can be procured by this system. Ballast of inferior quality may prove sufficient. The laying of the track and the surfacing when the wedges have reached their limit of life is difficult, compared with the ordinary track on wooden ties, but the difference is not sufficient to be of importance.

# General News Department

Leaders of the shop men's unions of 19 roads, west of Chicago, said to represent 35,000 men, are negotiating with the railroads for an 8-hour day and a 5 per cent increase an hour in wages. The conferences are taking place in cities throughout the west.

The Chicago, Milwaukee & St. Paul announces a wage increase of 2½ cents an hour for the 200 or more boiler makers and helpers employed between Mobridge, S. D., and the Pacific Coast. In future the average wage of the boiler makers on this system will be 49 cents, and that of the helpers 25 cents an hour. Nine hours will constitute a day's work as heretofore.

Representative Keating, of Colorado, on August 29 introduced in Congress a joint resolution directing the joint Congressional committee appointed to investigate the subject of railway regulation to investigate the proposed reorganization of the St. Louis & San Francisco and the application of the road to the Missouri Public Service Commission for authorization of an issue of stock and bonds to the amount of \$850,000,000.

The United States Civil Service Commission announces examinations October 4 for the following positions in the division of valuation, Interstate Commerce Commission: Junior civil engineer, grade 1; junior civil engineer, grade 2; junior mechanical engineer, grades 1 and 2; junior structural engineer,

grades 1 and 2. Salaries range from \$720 to \$1,080 for second grade positions, and \$1,200 to \$1,680 for first grade positions. Applicants must be between 21 and 36 years old.

The joint congressional committee recently appointed to investigate the subject of railway regulation has decided to hold hearings in Washington beginning November 20. It will be decided then whether hearings will be held in other cities. The investigation will also include the hours and wages of labor. The committee will invite to its hearings railway officers and employees, shippers, bankers, representatives of state and interstate commissions and commercial bodies. Frank Healy, secretary to Senator Newlands, has been elected secretary of the joint committee, and Willis Davis, secretary to Representative Adamson, assistant secretary of the committee.

## Revenues and Expenses of Express Companies for April, 1916

The following statement, which is subject to revision, has been compiled by the Interstate Commerce Commission from the monthly reports of operating revenues and operating expenses of the principal express companies for April, 1916 (the express companies have three months in which to make report):

A—FOR THE MONTH OF APRIL										
Item	Adams Express Co.		American Express Co.		Canadian Express Co.		Globe Express Co.*		Great Northern Express Co.	
	1916	1915	1916	1915	1916	1915	1916	1915	1916	1915
Mileage of all lines covered (miles)	44,973.36	44,878.65	73,805.97	72,616.10	10,238.13	9,676.50	.....	2,839.78	9,582.80	9,557.73
Charges for transportation	\$3,802,984	\$2,980,181	\$5,440,264	\$4,093,788	\$329,662	\$262,250	‡ \$31	\$54,749	\$272,229	\$242,408
Express privileges—Dr.	1,846,115	1,378,349	2,707,049	2,045,950	163,410	123,579	...	27,289	165,341	147,072
Operations other than transp.	50,182	44,773	284,050	217,945	15,533	5,559	...	865	4,759	4,343
Total operating revenues	2,007,052	1,646,605	3,017,265	2,265,773	181,785	144,230	‡ 31	28,325	111,647	99,679
Operating expenses	1,791,969	1,448,925	2,560,133	1,966,906	154,840	121,914	100	27,702	86,273	87,093
Net operating revenue	215,082	197,679	457,131	298,867	36,944	22,315	† 131	622	25,374	12,585
Uncollectible revenue from transp.	473	419	670	449	2	11	...	...	26	33
Express taxes	20,653	16,300	48,073	31,646	4,200	4,000	...	1,600	3,194	3,122
Operating income	193,955	180,959	408,387	266,772	22,742	18,304	† 131	977	22,153	9,429
B—FOR THE TEN MONTHS ENDING WITH APRIL										
Item	Adams Express Co.		American Express Co.		Canadian Express Co.		Globe Express Co.*		Great Northern Express Co.	
	1916	1915	1916	1915	1916	1915	1916	1915	1916	1915
Charges for transportation	\$34,557,964	\$28,351,210	\$46,771,419	\$38,198,826	\$3,172,105	\$2,571,009	\$1,361	\$593,099	\$2,786,495	\$2,575,967
Express privileges—Dr.	17,001,056	14,207,366	23,444,639	19,178,252	1,633,361	1,290,313	447	297,358	1,699,448	1,571,493
Operations other than transp.	473,062	412,837	2,621,899	1,844,674	63,850	49,994	10	8,053	48,061	42,989
Total operating revenues	18,029,970	14,556,680	25,948,678	20,865,248	1,602,594	1,330,690	925	303,794	1,135,109	1,047,463
Operating expenses	16,113,757	15,095,392	22,707,470	20,500,459	1,363,472	1,283,755	6,014	290,748	877,843	886,344
Net operating revenue	1,916,212	† 538,711	3,241,207	364,788	239,121	46,935	† 5,089	13,046	257,265	161,119
Uncollectible revenue from transp.	5,743	4,870	7,929	2,201	455	88	...	...	201	88
Express taxes	186,342	168,789	442,270	329,061	42,000	40,000	4,200	10,600	37,438	38,002
Operating income	1,724,126	† 712,372	2,791,007	33,525	196,666	6,846	† 9,289	2,446	219,624	123,027
Item	Northern Express Co.		Southern Express Co.		Wells Fargo & Co.		Western Express Co.		Total for Companies Named.	
	1916	1915	1916	1915	1916	1915	1916	1915	1916	1915
Charges for transportation	\$2,495,282	\$2,261,871	\$13,683,118	\$11,691,037	\$37,157,591	\$31,490,638	\$1,163,606	\$953,923	\$141,768,946	\$118,687,585
Express privileges—Dr.	1,355,562	1,236,108	7,032,551	6,037,075	19,178,640	16,113,814	558,584	497,215	71,904,293	60,428,997
Operations other than transp.	38,908	32,875	289,695	252,854	941,667	592,273	36,461	30,811	4,516,618	3,267,363
Total operating revenues	1,178,629	1,058,638	6,940,263	5,906,816	18,920,618	15,969,097	641,482	487,520	74,398,271	61,525,951
Operating expenses	885,425	884,940	5,493,659	5,261,464	16,235,904	14,803,204	541,838	517,837	64,225,387	59,524,148
Net operating revenue	293,203	173,697	1,446,604	645,352	2,684,713	1,165,893	99,644	† 30,137	10,172,884	2,001,803
Uncollectible revenue from transp.	667	150	942	528	11,030	8,998	67	91	27,039	17,018
Express taxes	50,000	50,000	143,072	145,888	332,034	351,015	11,558	9,986	1,248,917	1,143,344
Operating income	242,536	123,547	1,302,589	498,935	2,341,648	805,879	88,017	† 40,395	8,896,928	841,441

\* Discontinued operations on April 30, 1915. † Deficit or loss. ‡ Debit item.



September 8, 1916

## REVENUES AND EXPENSES OF RAILWAYS

### MONTH OF JUNE, 1916

#### —Operating expenses—

[illegible]

### A Correction

In the article describing the gasoline switching locomotive for the Erie, which was published in the *Railway Age Gazette* of August 11, page 232, the data concerning the cylinders, drive and capacity of the gasoline tank were incorrectly stated. There are six cylinders of 7¼ in. diameter and 12 in. stroke. The engine is driven by means of Scotch yoke side rods; and the capacity of the gasoline tank is 40 gallons.

### First Meeting of the Rock Island System Loss and Damage Committee

In an article which will appear in the next issue of the Rock Island Employees' Magazine, W. O. Bunker, general superintendent of freight claims of the Chicago, Rock Island & Pacific, gives an account of the first meeting of the system loss and damage committee, and summarizes the achievements of the organization during its first half year of existence.

The meeting was held at Kansas City, Mo., on August 7, 8 and 9, and was attended by 151 officers and employees. It was shown by a comparison of claim payments made during the fiscal years of 1915 and 1916 that noticeable reductions were made in the later period on practically all commodities listed and in all causes tabulated, except the one item of payments due to errors of employees, which showed a small increase unquestionably due to a more definite determination of causes than in previous years. Briefly stated, the 1916 payments showed, as compared with those of the previous year, a reduction of \$265,000 in the amount charged out as concealed or unlocated loss or damage, which means that a larger proportion of payments were charged to definite causes. Yet the definite causes show a reduction in payments under 1915 as follows: Robbery, 47 per cent; wrecks and fires, 18 per cent; defective equipment, 37 per cent; grain, 22 per cent; live stock, 34 per cent; all carloads, including switch cars, 34 per cent. The total amount charged to loss and damage from all causes showed a reduction from 1915 of \$400,000, and, taking into consideration increased freight revenue, the saving approximated \$500,000.

Instructive exhibits were shown at the meeting, including different designs of grain doors; especially constructed racks used successfully in bracing shipments of butter and eggs, and under contemplation for use in bracing other freight; heavy canvas curtains used with much success in partitioning off cars, making it possible to use one end of the car for shipments requiring refrigeration, and the other end for ordinary shipments or even for shipments requiring heater protection, with a large saving in icing cost; devices recommended for use in sealing and re-coopering bad order packages; and a device known as an impact register used for locating points at which cars are roughly handled.

The system committee will convene again on January 8, 9 and 10, 1917, at Hot Springs, Ark.

### Railway Signal Association

The secretary of the Railway Signal Association announces that there has been no change in the date of the association's convention and that the meeting will be held at the Grand Hotel, Mackinac Island, Mich., September 12-14, as originally planned. The secretary also advises persons from New York, Boston and vicinity to take train No. 17, leaving at 5:00 p.m. on September 10 from Grand Central Terminal, New York.

## MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings and places of meeting of those associations which will meet during the next three months. The full list of meetings and conventions is published only in the first issue of the *Railway Age Gazette* for each month.

- AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D. L. & W., Hoboken, N. J. Annual convention, October 19-21, New Orleans, La.
- AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York. Annual meeting, October 17, 18, Washington, D. C.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 8 W. 40th St., New York. Annual convention, October 9-13, Atlantic City, N. J.
- AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—H. G. McConaughy, 165 Broadway, New York. Annual convention, October 9-13, Atlantic City, N. J.
- AMERICAN RAILWAY ASSOCIATION.—J. E. Fairbanks, general secretary, 75 Church St., New York. Next meeting, November 15, 1916, Denver, Colo.

- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 17-19, New Orleans, La.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.
- ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Annual convention, October 10, 1916, Waldorf-Astoria, New York.
- BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—P. C. Jacobs, H. W. Johns-Manville Co., Chicago. Meetings with American Railway Bridge and Building Association.
- CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.
- CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.
- CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.
- CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.
- CINCINNATI RAILWAY CLUB.—H. Boutet, Chief Interchange Inspector, Cin'ti Rys., 101 Carew Bldg., Cincinnati. Regular meetings, 2d Tuesday, February, May, September and November, Hotel Sinton, Cincinnati.
- ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh, Pa.
- GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month. Room 1856, Transportation Bldg., Chicago.
- MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—F. W. Hager, Fort Worth & Denver City, Fort Worth, Tex. Next convention, October 17-19, Philadelphia, Pa.
- MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next annual meeting, September 12-14, 1916, "The Breakers," Atlantic City, N. J.
- NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meeting, 2d Tuesday in month, except June, July, August and September, Boston.
- NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.
- NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. N. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.
- PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.
- RAILROAD CLUB OF KANSAS CITY.—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.
- RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.
- RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Annual meeting, October 3-5, 1916, New York.
- RAILWAY REAL ESTATE ASSOCIATION.—Frank C. Irvine, 1125 Pennsylvania Station, Pittsburgh, Pa. Annual meeting, October 11-13, 1916, Chicago.
- RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Myers Bldg., Bethlehem, Pa. Next annual convention, September 12-14, 1916, Grand Hotel, Mackinac Island, Mich.
- RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.
- ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W., Sterling, Ill. Next annual convention, September 19-22, 1916, New York.
- ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.
- SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.
- SOCIETY OF RAILWAY FINANCIAL OFFICERS.—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa. Annual meeting, October 18-20, Washington, D. C.
- SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. R. R., Atlanta, Ga. Next meeting, October 19, 1916, Birmingham, Ala.
- SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grand Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Piedmont Hotel, Atlanta.
- TOLEDO TRANSPORTATION CLUB.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.
- TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.
- TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.
- TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria Hotel, New York.
- TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, N. Y. C. R. R., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.
- TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. R. R., Cleveland, Ohio. Next meeting was to have been September 5-8, 1916, Hotel Sherman, Chicago, but was postponed on account of train employees' wage controversy.
- UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, 1111 Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Salt Lake City.
- WESTERN CANADA RAILWAY CLUB.—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.
- WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Grand Pacific Hotel, Chicago.
- WESTERN SOCIETY OF ENGINEERS.—E. N. Lavfield, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings. Annual meeting, 1st Wednesday after 1st Thursday in January, Chicago.



## Traffic News

The Panama Canal was opened to traffic September 5, after a blockade of about a week by landslide.

Nine railways operating in the province of Ontario, Canada, have promised the government to discontinue the sale of liquor on trains within that province.

Railroads operating in Nebraska have applied to the state railroad commission for permission to reduce the free time allowance on freight cars of 60,000 lb. capacity or more, from 60 to 48 hours. If the request is granted the intrastate allowance will become the same as the interstate allowance, which is 48 hours on cars of all capacities.

The Federal Express, running through once a week between Boston and Washington, over the Poughkeepsie bridge, is to be continued through the month of September; and southbound it will run twice a week, leaving Boston on Thursdays and Sundays, including Sunday, October 1. Northbound, the train will be run on September 8, 15, 22 and 29.

The American Steel & Wire Company, calling attention to the Interstate Commerce Commission's statement of August 10, concerning an impending car shortage, has asked its customers to co-operate with the carriers in order that delays and losses may, so far as possible, be avoided. "Inability to ship," says the circular, will, at this season, with the shortage of iron and steel material in every direction, "be very injurious to your interests. We hope, therefore, that you will take every possible means to unload cars very promptly."

**LOAN FOR EXTENSION OF COLOMBIAN RAILWAY.**—The Colombian Congress has authorized the government to contract one or more loans for a total sum not to exceed \$400,000, to be used in the extension of the Tolima Railway to Ibaguë. The authorization as published in the *Diario Oficial* specifies that the loan will be guaranteed by a mortgage on the railway, including the part already constructed. The usual interest rates and the amortization will be covered by the proceeds of the railway, secured by 2 per cent of the proceeds of the Atlantic custom houses.

**THE CHANNEL TUNNEL.**—Since Queen Victoria and Napoleon III agreed that a submarine connection between England and France would be a benefit to both countries, many tides have flown over the site of the proposed channel tunnel—and many changes have taken place in sub-aqueous tunnel construction, which no doubt will be fully considered by the present promoters of the scheme. Both the tunnel itself and the necessary drains from the center to each shore can now be constructed so comparatively cheaply and expeditiously that some of the principal objections to the project have been greatly weakened. It is a question, indeed, whether the small amount of water that should enter the tunnel cannot be got rid of by other means than by drains. It will probably be found advisable to keep at a greater depth below the bed of the channel than was originally designed; this will involve steeper gradients—but with electric traction and regenerative control this will not add to the difficulty of working the traffic. With present systems of signaling it will be possible to run many more trains than in the old steam tunnels; also it may be taken for granted that Sir John Hawkshaw's two straight inclines meeting in the center will be adopted instead of the crooked line, advocated, in order to avoid possible water-bearing strata; indeed, at the increased depth, it is very doubtful if these would be encountered—nor with present appliances and after experience elsewhere need they be considered as of much importance compared with the advantages of the straight run. The danger of invasion would surely be overcome by some device by which the authorities, by touching a button, might flood the center part of the tunnel up to its intrados. Provision will, of course, be made for telephone and telegraph wires, and it may be safely asserted that the time has now come for carrying out the queen and the emperor's long-deferred proposal.—*Railway Gazette, London.*

## Commission and Court News

### INTERSTATE COMMERCE COMMISSION

#### Iron Ore Rate Cases

##### *Opinion by Commissioner Harlan:*

With certain exceptions it is found upon the whole record that (a) the present groups, both of the lake ports and points of destination, (b) the rate relationships of the several destination groups, and (c) the iron-ore rates themselves are unreasonable and discriminatory. Reasonable maximum rates are prescribed for the future. The carriers are further required to establish separate charges for storing ore on their docks and for certain other dock services performed by them, and for switching and other services on private industry tracks. Reasonable maximum rates are prescribed for the dock services, and a charge on the engine-hour basis suggested for the services on the private industry tracks.

This proceeding is a general investigation of the rates and practices of the rail carriers of iron ore from the lower Lake Erie ports to points in Ohio, Kentucky, West Virginia, and western Pennsylvania. The traffic amounts to about 25,000,000 long tons a year and yields to the rail carriers a revenue of about \$20,000,000.

The ore originates at mines in Wisconsin, Minnesota, and the upper peninsula of Michigan. It reaches the lower Lake Erie ports by vessel and is there handled over the docks and forwarded to interior destinations by rail. Most of the docks are owned by the railroads; there are, however, a number of independent or privately owned ore docks. In some cases the railroads themselves operate their docks, but in most instances they employ stevedores or dock companies to do the work. About 79 per cent. of the ore is handled from the vessels directly to the cars for immediate shipment to destination. This is known as "direct" ore. The remaining 21 per cent. is placed in storage on the docks and is later forwarded to destination by rail. This is called "dock" ore.

Elaborate, powerful, and costly machinery is used in unloading the vessels, loading the cars, and in handling the ore to and from the storage yard. At the present time all the machinery and other facilities on the railroad docks are owned by the railroads, and a uniform charge of 10 cents per long ton is assessed by the rail carriers against the lake carriers for raising the ore from the hold to the "rail of the vessel." The charges for the rail line service, both for direct ore and dock ore, apply from the "rail of the vessel" to final destination. These charges in most cases are 8 cents, and in some cases 10 cents, higher per long ton on dock ore than on direct ore because of the storage and additional service required in handling the dock ore.

Many destination points take the same rate, and, generally speaking, the rate to a given point is applicable from more than one lake port. In other words, both the lake ports and the destination points are grouped. The destination groups are usually referred to as districts, as, for example, the Pittsburgh district, the Wheeling district, the Beaver district, etc. There is no official grouping as sometimes provided for in railroad tariffs.

In the table following the lowest rate on direct ore to the several groups and principal individual destination points is shown. There are varying rates in effect to certain of the groups. The rates are stated in cents per long ton:

Group No.	District	Lowest rate on direct ore	Lake ports from which rate is applicable
1	Cincinnati .....	90	Cleveland
2	Ashland-Ironton .....	90	Various
3	Hamilton-Wellston .....	62½	Toledo
4	Zanesville-Coshocton .....	55	Various
5	Wheeling .....	88	Do.
6	Beaver .....	70	Do.
7	Valleys .....	56	Do.
8	Pittsburgh .....	88	Do.
9	Johnstown-Scottdale .....	102	Do.
10	Josephine-Vandergrift .....	93	Cleveland Ashtabula Erie
11	Du Bois-Punxsutawney .....	60	Buffalo
..	Josephine, Pa. ....	85	Do.
..	Columbus, Ohio .....	50	Various
..	New Straitsville, Ohio .....	52½	Toledo

The commission considered the following special questions: (a) discrimination as between general districts; (b) the burden of proof; (c) carriers' charges for unloading vessels; (d) operation of ore docks by stevedores or dock companies under contract with carriers; (e) cost of transporting iron ore and constructive rates based thereon.

Taking into consideration the generally shorter haul for iron ore, its value compared with the value of other commodities, and making due allowance for the special services accorded this commodity at the ore docks, while in transit, and at destination, the commission does not find, as contended by certain of the shippers, that it is paying more than a fair proportion of the gross revenue derived by the respondent carriers from the transportation of freight. This is particularly true if comparisons be limited to heavy loading bulk commodities generally transported in open cars. In saying this, however, it does not wish to be understood as indorsing or approving all the present rates, rules, and regulations governing shipments of iron ore.

There are several distinct operations that occur independently of each other as follows:

1. Unloading the ore from the vessel, or, technically speaking, raising the ore from the hold to the rail of the vessel.
2. Loading the ore into the car directly from the vessel when for immediate shipment to destination.
3. Placing the ore in the pit or trough if for storage.
4. Handling the storage ore from the pit or trough to the storage yard.
5. Holding the ore on storage in the storage yard.
6. Loading the ore into the car from the storage pile at the time of shipment to the final destination.
7. Hauling to destination by rail.
8. Placing the cars at the point of unloading on the private industry tracks at the furnace plants and returning them to the carriers' tracks after having been unloaded.

The carriers at present impose a separate charge for lifting the ore from the hold to the rail of the vessel. Of the other services enumerated above, the commission thinks that separate charges should be made as follows, the rates named being prescribed as reasonable maximum rates for the future:

	In cents per long ton
For handling the ore from the rail of the vessel, or point where it is received by carriers for transportation by rail, into the cars when for immediate shipment to interior destinations.....	6
For handling the ore from the rail of the vessel, or point where it is received by carriers for transportation by rail, to the storage yard .....	16
For handling storage ore from the storage piles into the cars for shipment to interior destinations .....	10
For storing ore on the docks, per month, from date of unloading from vessel .....	1

Storage charges should be collected monthly as they accrue, and other charges at the time the service is performed.

The commission finds further that the rates to certain points and groups are unreasonably high, while to some of the destinations and groups they appear to be intrinsically and relatively low. The record also shows many inconsistencies in the rate structure, particularly when considered from the standpoint of the distance from the lake ports, and these inconsistencies appear whether the short line, the mean average, or the weighted average distances be used as a basis for making comparisons. The rates appear to be illogical and inconsistent also, whether the territory under investigation be considered as a whole or whether the eastern district, the central district, and the western district be considered separately.

Maximum rates for the future are prescribed as follows, the rates named being applicable from the tracks of line-haul carrier at the lake port after the ore has been loaded into cars to the point of interchange with private industry tracks at destination:

*Youngstown group, 50 to 74 miles, rate 50 cents.*—Niles, Alliance, Hubbard, Canton, Girard, Youngstown, Brier Hill, Haselton, Massillon, Struthers and Lowellville-Bentley, Ohio; Shenango, Farrell, Greenville, Sharon, Titusville, Sharpsville, Wheatland and West Middex, Pa.

*Leetonia group, 75 to 99 miles, rate 55 cents.*—Leetonia and New Philadelphia, Ohio; New Castle, Canal Dover, Franklin, Elwood City and Beaver Falls, Pa.

*Midland group, 100 to 124 miles, rate 64 cents.*—Steubenville and Mingo Junction, Ohio; Monaca, Aliquippa, Woodlawn, Butler, Midland, Ambridge, Coraopolis, Neville and McKees Rocks, Pa.

*Pittsburgh-Wheeling group, 125 to 159 miles, rate 55 cents.*—Martin's Ferry, Bridgeport and Bellaire, Ohio; Follansbee, Benwood and Wheeling, W. Va.; Pittsburgh, Allegheny, Hays, Homestead, Lucas, Etna-Sharpburg, Carnegie, Avenue-Brackenridge, Rankin, Leechburg, Verona, Vandergrift, Bessemer, Munhall, South Duquesne, McKeesport, Kittanning, Clairton-Wylie, Avonmore, Irwin, Briquette and Mifflin Junction, Pa.

*Monessen-Johnstown group, 160 to 199 miles, rate 88 cents per long ton.*—Monessen, Donora, Latrobe, Josephine, Newell, Scottdale, Everson, Connelville, Dunbar and Johnstown, Pa.

The commission does not at this time definitely fix the maximum charges for the service of placing cars upon private industry tracks at destination. Under the present practice, it appears that this service is performed in units of time rather than in units of tons and cars; therefore it is suggested that the locomotive hour will perhaps afford the most reliable basis for a charge, but this will be left for practical consideration by the carriers.

Commissioner McCord dissents. He is unable to agree with the findings in so far as they result in increased rates to Monessen and Donora, points now embraced in the Pittsburgh district but transferred by regrouping to the Monessen-Johnstown group. He does not approve the rates to the Pittsburgh-Wheeling and other groups. The effect in part of the regrouping is to increase the rates to Monessen on direct ore from 88 to 94 cents. "It seems that the commendable desire to work out more logical groups has, in the judgment of the majority, outweighed the evidence relating to the reasonableness of the rates themselves and other considerations properly bearing upon the issues before us." (41 I. C. C., 183.)

## PERSONNEL OF COMMISSIONS

E. G. Rider of Sutton, West Virginia, has been appointed a member of the Public Service Commission of that state in place of W. M. O. Dawson, deceased.

Hon. Samuel W. Pennypacker, a member of the Pennsylvania Public Service Commission, and formerly, for six years—1903 to 1909—governor of the state, died at his home near Schwenksville, Pa., September 2, at the age of 73. He had been on the commission four years.

## COURT NEWS

### Service on Agents of Company

The Illinois Supreme Court holds that a ticket agent, not in the employ of a railroad, but employed as the agent of a connecting carrier, which employment includes the sale of tickets over the railroad's line, is not an agent of the railroad on whom service of summons may be made under the Illinois Practice Act.—*Barnard v. Springfield & Northeastern (Ill.)*, 113 N. E., 89.

### Bridge Repairers Engaged in Interstate Commerce

The Arkansas Supreme Court holds that a bridge repairer in the employ of a railroad engaged in interstate commerce fatally injured through the negligence of his fellow-servants while one of a crew engaged in removing old bridges and while removing the bolts from old caps lying clear of the rails, was "engaged in interstate commerce," since the repairing of the bridge would only be accomplished by removing the bridge timbers so far away that their presence would not materially injure the operation of trains or increase the danger of fire from passing trains.—*Long v. Lusk (Ark.)* 186 S. W., 601.

### Sufficiency of Notice of Loss

The Kansas City Court of Appeals holds that under a shipping contract requiring the shipper to give written notice within four months for loss, damage, or delay, notice of damage to berries "on account of delay," could not mislead nor relieve the carrier of liability, where the damage was caused, not by delay, but by improper care in transit; the notice being for the purpose of giving the carrier opportunity to investigate the merits of the claim while the facts are fresh and information readily obtainable.—*R. W. Gess Commission Co. v. Illinois Central (Mo.)* 186 S. W., 1136.

### Fencing Statute

The Wisconsin fencing statute renders liable a railroad which does not fence its roadbed for damages "occasioned by the want of a fence." A boy of 16 entered upon a railroad's unfenced right of way, boarded a moving freight train, and, in attempting to leave the train while in motion, after it had traveled for some miles, was killed. The Wisconsin Supreme Court holds that the road was not liable for the death. The boy's voluntary act of jumping off the moving train was wholly unrelated to the company's omission to fence, and the latter could not be considered as causing the death in any incidental or in-



direct manner.—*Vaillant v. Chicago & North Western (Wis.)*, 158 N. W., 311.

#### **"Interstate Shipment"**

A manufacturer shipped by railroad to a point in the same state goods sold and to be delivered to another railroad company, billing them at the purchaser's request to a point on the latter's line in another state, to which they were transported by the purchasing railroad as its own goods. In an action to recover alleged overcharges the St. Louis Court of Appeals holds that the shipment, being continuous, was interstate, justifying the interstate rate rather than the intrastate rate on the haul to said junction point.—*Werner Sawmill Co. v. Kansas City Southern (Mo.)*, 186 S. W., 1118.

#### **Crossing Accident—Contributory Negligence**

In an action for the death of the driver of a covered wagon, struck by a train at a crossing in Philadelphia, it conclusively appeared that if the deceased looked before driving upon the crossing, he must have seen the approaching train in ample time to avoid the accident, there being a space of 25 feet, affording a clear view down the tracks for a block. The Pennsylvania Supreme Court held that a verdict should have been directed for the railroad, notwithstanding the testimony of a witness who was riding with the deceased, that they stopped and looked when about 7 or 8 feet from the track and saw no train approaching.—*Bernstein v. Pennsylvania (Pa.)*, 97 Atl., 933.

#### **Evidence of Setting Fires**

In an action against a railroad for setting fire to a barn, the Michigan Supreme Court held that verdict for the plaintiff was contrary to the great weight of the evidence where it was shown that the barn was located at a comparatively great distance from the track; there had been frequent showers the day prior to the fire; no other fires had been set in the vicinity, and the locomotive in question had never before been charged with setting fire. The evidence of the good state of repair of the locomotive on the morning of the fire was convincing. Judgment for the plaintiff was therefore reversed.—*Malloy v. Grand Trunk (Mich.)*, 158 N. W., 854.

#### **Fires—Burden of Proof of Negligence**

Action was brought to recover damages for the destruction of a lot of lumber by fire. The lumber was placed on the defendant's right of way for shipment. Fire was communicated to it from a camp or commissary car used by the railroad's section hands, stationed on a side track near the lumber. The origin of the fire in the car, whether accident, negligence or intentional act, was not shown. The Alabama Supreme Court holds that where fire is communicated from a railroad right of way, in consequence of a burning building, or of a burning car standing on the track, the same rule applies as in the case of any other owner of property; that, where such owner sets a fire on his own premises for a lawful purpose and in a proper and careful manner, and without negligence, or the fire accidentally starts without his fault, he is not liable for damages caused by its being communicated to the property or premises of another unless he is thereafter guilty of negligence in failing to control or extinguish the fire before it spreads; and the burden of proof of such negligence is on the party alleging it.—*Poe v. Southern (Ala.)*, 71 So., 997.

#### **Liability for Outrage by Public Officer**

A colored man 66 years old and his wife went as passengers from Newton to Walton, Kansas, arriving late in the afternoon. They failed to find the man they went to see, and desired to remain in the station until the train back to Newton, due in about an hour and a half, should come. The town marshal came in, looked at them, asked the ticket agent where they were going, and ordered them out, telling them they could not get a train till late the next morning and "they could make it back to Newton before that time." When they expressed a desire to get a ticket and remain in the station, he told them they could not stay there, and he would lock them up if they went up town, and with some

force ejected them from the station; the station agent being within sight and hearing and making no remonstrance, but taking no part in the expulsion. Being thus compelled to walk back to Newton on a dark and inclement evening, they received injuries for which they sued the railroad, on the theory that it was the agent's duty to protect them from the actions of the officer. Remarking that a considerable research had failed to discover any case exactly similar and but few bearing any analogy to the case under consideration, the Kansas Supreme Court, assuming, without deciding, that the plaintiffs were entitled to the right of passengers waiting to take a train, held that the railroad was not rendered liable for the mere noninterference with the officer by the agent.—*Fenwell v. A. T. & S. F. (Kan.)*, 158 Pac., 14.

#### **Duties Towards Passengers Alighting**

The Oklahoma Supreme Court holds that generally the contract of a carrier is that it will carry the passenger safely and in a proper carriage, and afford him safe and convenient means for entering cars and alighting therefrom; but it does not contract to render him personal service or attention beyond that. The recognized exceptions to the general rule are passengers who by reason of illness, great age, or other infirmity, are unable to help themselves. Action was brought by a woman for injuries received in falling from the step of a car while attempting to alight. Her husband had advised the conductor and the porter of the train at starting that his wife, who had been pregnant for about four months, and was accompanied by several small children, and carried a grip and a lunch basket, would have to change cars, and would need some assistance. It appeared that the conductor assisted the children to alight, and that he was there, ready to assist her. The jury gave a verdict for the plaintiff, but the Oklahoma Supreme Court held that, considering the evidence most favorable for the plaintiff, there was none which reasonably tended to support such a verdict, and reversed the judgment. The cause of the fall was uncertain. The plaintiff was strong enough to perform the duties of a field hand the day before the accident, and there was no evidence of any particular sickness on that day. It could not be said that the railroad was charged with knowledge that after a ride of less than 25 miles she was so weakened that she came within the exception of sick or infirm persons to whom the carrier owed a duty, and that she could not carry a basket containing one day's lunch and a grip whose weight she did not testify to.—*St. Louis & S. F. v. Dobyns (Okla.)*, 157 Pac., 735.

#### **Stipulation as to Claim for Loss Cannot be Waived in Interstate Shipments**

In an action for the loss of household goods, the Kansas City Court of Appeals holds that where a shipment is interstate, the stipulation of the bill of lading that claims for loss or damage shall be made within four months, is valid. No notice of loss was given, and suit was not brought until nearly three years after the shipment. A railroad, by accepting and receiving a shipper's claim after the time stipulated in the bill of lading and by declining to pay on other grounds than want of notice, cannot waive the requirement of notice within the stipulated time. That would violate the Federal Interstate Commerce act, forbidding discrimination. A railroad cannot voluntarily say to one shipper, I will enforce the burdensome terms of our contract requiring notice in a specified time, and to another, I will release you from the same provisions in the same character of contract. The court remarked in passing that the order in *Bills of Lading*, 29 Interst. Com. R., 417, and the opinion therein, disclosed that the carriers and the commission construed the statute as prohibiting waivers of the contractual provisions as to notice. Several cases were cited to the court from the United States Supreme Court and the State Courts of Appeals on the subject of waiver; but these were not decided on the Interstate Commerce statute. That statute and the decisions thereon by the Supreme Court of the United States have superseded state laws and the decisions of the different states.—*Banaka v. Missouri Pac. (Mo.)*, 186 S. W., 7.

In another case before the same court it was held that under such a stipulation notice is required even in case of a willful misdelivery by the final connecting carrier.—*Kemper Mill Co. v. Missouri Pac. (Mo.)*, 186 S. W., 8.

## Railway Officers

### Executive, Financial, Legal and Accounting

C. W. Pidcock, Jr., has been appointed assistant treasurer and purchasing agent of the Georgia Northern.

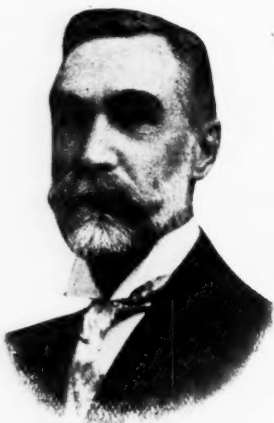
G. R. Martin, controller of the Great Northern, at St. Paul, Minn., has been elected a vice-president, effective September 1.

Nathaniel Montgomery Rice, the announcement of whose election to the office of third vice-president of the reorganized St. Louis & San Francisco was recently made, was born December 28, 1863, at Rome City, Ind. He received his early education in the public schools at that place, and in May, 1887, entered railway service as a brakeman on the Gulf, Colorado & Santa Fe. He served in various capacities in the transportation and store departments of this same company, and on April 1, 1901, he was made assistant general storekeeper of the Atchison, Topeka & Santa Fe Coast Lines, which connection he held until April 1, 1903, when he became general storekeeper in full charge of material, fuel and stationery, serving the entire system. In November, 1913, he was appointed chief purchasing agent of the St. Louis & San Francisco, with headquarters at St. Louis, Mo., which latter office he retained up to the time his present appointment became effective.

Charles W. Hillard, whose election as fourth vice-president of the St. Louis-San Francisco, has already been announced, was born on June 9, 1855, in Northampton, England. He began railway work in 1876 as assistant secretary of the Chicago, St. Paul & Minneapolis, remaining in that position until the road was absorbed by the Chicago & North Western in December, 1882. In 1885 he became secretary and treasurer of the Chicago & Indiana Coal Railway, which was consolidated in 1887 with the Chicago & Eastern Illinois, when he became vice-president and treasurer of the combined company. In October, 1902, control of the Chicago & Eastern Illinois was secured by the St. Louis & San Francisco, and Mr. Hillard was made controller of the 'Frisco, in addition to his other duties, and on February 9, 1906, was elected also fourth vice-president of the Chicago, Rock Island & Pacific. In December, 1907, he was elected vice-president of the 'Frisco, resigning the duties of controller at that time, and in October, 1908, was elected also vice-president of the Evansville & Terre Haute. In December, 1909, when the Rock Island-'Frisco properties were separated, Mr. Hillard resigned as vice-president of the Chicago, Rock Island & Pacific, remaining as vice-president of



N. M. Rice



C. W. Hillard

the St. Louis & San Francisco, the Chicago & Eastern Illinois and the Evansville & Terre Haute. Since May, 1913, until his present appointment became effective, he served under the receivership of the 'Frisco as agent in the treasury department with headquarters at New York.

E. L. Brown, formerly vice-president and general manager of the Denver & Rio Grande, has been elected president of the Minneapolis & St. Louis, succeeding Newman Erb, who has resigned. C. W. Huntington has been re-elected vice-president, but not general manager.

Arthur Colburn Griffith, whose appointment as auditor and treasurer of the Pittsburgh & Shawmut, with headquarters at Kittanning, Pa., has already been announced in these columns, was born on December 4, 1866, at Batavia, Ill. He was educated at Chicago University and at Oberlin (Ohio) College, and began railway work in August, 1891, in the accounting department of the Gulf, Colorado & Santa Fe. Mr. Griffith left the service of the G. C. & S. F. in 1902, and for a short time in 1903 served in the accounting department of the Delaware, Lackawanna & Western. In August of the same year he went to the Pittsburgh & Shawmut in the freight accounting department, and on February 1, 1905, was appointed chief clerk, which position he held until his recent appointment as auditor and treasurer of the same road, as above noted.

Edward Dailey Levy, whose election as second vice-president and general manager of the newly reorganized St. Louis & San Francisco was recently announced, was born October 16, 1879, at Paris, Tex., and received his early education in the public schools of that city and at Dallas, Tex. In February, 1898, he entered the service of the Santa Fe Refrigerator Dispatch at Chicago, Ill., since which time he has been consecutively to May 1, 1904, stenographer in the office of assistant superintendent of motive power and equipment, Michigan Central at Detroit, Mich.; stenographer in the office of general superintendent, Chicago, Milwaukee & St. Paul, at Chicago, Ill.; stenographer in the office of the industrial commissioner, Atchison, Topeka & Santa Fe; secretary to division superintendent same road; stenographer in the office of master mechanic, Atchison, Topeka & Santa Fe Coast Lines at Needles, Cal.; stenographer in the office of master mechanic, Ft. Worth & Denver City, at Ft. Worth, Tex.; stenographer in the office of vice-president and general manager, Mexican Central Railway, City of Mexico; stenographer in the office of division superintendent, and trainmaster's clerk, Kansas City Southern at Texarkana; secretary to general superintendent; stenographer and file clerk in general superintendent's office, Gulf, Colorado & Santa Fe at Galveston, Tex.; secretary to general manager and transportation clerk in general manager's office; senior clerk in general manager's office; May 1, 1904, to August 15, 1906, chief clerk to general superintendent same road; August 15, 1906, to June 1, 1907, assistant superintendent car service, St. Louis & San Francisco, at Springfield, Mo.; June 1, 1907, to May 1, 1911, superintendent of transportation; May 1, 1911, to March 1, 1914, assistant general manager of the same road, with headquarters at Springfield, Mo. From March 1, 1914, until his present appointment became effective he was general manager, with headquarters at St. Louis, Mo.



E. D. Levy

### Operating

J. J. Rounds, trainmaster of the Delaware & Hudson at Carbondale, Pa., has been appointed superintendent of telegraph, with office at Albany, N. Y.



F. C. Fox, general manager of the western lines of the Atchison, Topeka & Santa Fe, with headquarters at Amarillo, Tex., has been appointed general manager, eastern lines, succeeding C. W. Kouns, deceased.

Joseph Henry Nuelle, whose appointment as general superintendent of the New York, Ontario & Western, with headquarters at Middletown, N. Y., has been announced, was born on April 9, 1881, at Chicago, Ill. Mr. Nuelle was educated at Phillips Exeter Academy and at Princeton University, and began railway work in June, 1906, with the Pennsylvania Lines at Chicago, Ill. In 1907 he went to the New York, Ontario & Western as assistant engineer, and in September, 1911, was appointed principal assistant engineer. From January, 1912, to July, 1913, he was engineer of maintenance of way, and then was promoted to chief engineer; in June, 1915, he was appointed also assistant general superintendent, and now becomes general superintendent of the same road, as above noted.

#### Traffic

A. Revis Witherspoon has been appointed general agent of the Chicago, St. Paul, Minneapolis & Omaha, with headquarters at Winnipeg, Can., succeeding Wilfred S. R. Cameron, resigned.

J. E. Tilford has been appointed assistant general freight agent of the Atlanta, Birmingham & Atlantic with headquarters at Atlanta, Ga. C. I. Allen, commercial agent at Jacksonville, Fla., has been appointed general agent with office at Jacksonville, and the position of commercial agent has been abolished.

P. F. Finnegan, general freight and passenger agent of the Baltimore & Ohio Chicago Terminal Railroad, has been appointed general western freight agent of the Baltimore & Ohio, with headquarters at Chicago, succeeding C. H. Harkins, appointed assistant to western freight traffic manager. George A. Upton, northwestern freight agent of the Baltimore & Ohio at Minneapolis, Minn., has been transferred to Chicago as commercial freight agent, succeeding H. S. Garvey, resigned. D. E. Sullivan, commercial freight agent at Milwaukee, succeeds Mr. Upton as northwestern freight agent, with headquarters at Minneapolis, and George D. Richards has been appointed commercial freight agent, succeeding Mr. Sullivan.

Frank H. Moser, whose appointment as coal freight agent of the Lehigh Valley, with headquarters at New York, has already been announced in these columns, was born at Mauch



F. H. Moser

Chunk, Pa. He entered the service of the Lehigh Valley in 1909 and served as chief clerk to W. T. Grier, who at that time was coal freight agent. On October 14, 1914, when Mr. Grier was appointed general traffic manager, Mr. Moser was temporarily placed in charge of coal freight matters and remained in that position until his recent appointment as coal freight agent of the same road, with headquarters at New York, as above noted. Prior to his railroad service, Mr. Moser had been connected with the coal

mining industry, serving in various capacities.

M. H. Jacobs, whose appointment as general freight agent of the Western Maryland, with headquarters at Baltimore, Md., has already been announced in these columns, was born on August 12, 1877, at Waynesboro, Pa. He was educated in the public schools, and began railway work on October 1, 1893, with the Western Maryland as messenger boy at York, Pa. In December, 1900, he was transferred to the commercial freight agent's office at Baltimore, Md. He later served consecutively as soliciting freight agent, and traveling freight agent until

August 1, 1912, when he was appointed general agent at Pittsburgh, Pa. In November of the following year he became assistant general freight agent at Pittsburgh, which position he held until his recent appointment as general freight agent of the same road, as above noted.

Donald Wilson, whose appointment as general freight agent of the Long Island Railroad, with headquarters at New York, has already been announced in these columns, was



D. Wilson

born at Harrisburg, Pa., on May 11, 1875, and was educated in the public schools of his native town. He entered the service of the Pennsylvania Railroad on August 1, 1888, as a clerk in the freight department in the Kensington district, Philadelphia, Pa. Five years later he was transferred to the division freight agent's office at Washington, D. C., where he remained for five years. He was then for two years connected with the general freight agent's office at Philadelphia, Pa. On March 18, 1901, Mr. Wilson entered the service of the Long Island Railroad as chief freight clerk. Later, in the same year, he was made chief clerk in the freight department and on January 1, 1905, was appointed superintendent of express. Two years later he was appointed special agent of the traffic department and now becomes general freight agent of the same road, with headquarters at New York, as above noted.

#### Engineering and Rolling Stock

L. S. Werthmuller has been made acting signal supervisor of the St. Louis Terminal division of the Union Pacific, succeeding L. R. Mann, promoted.

W. L. Whittington has been appointed acting signal supervisor of the eastern division of the Missouri Pacific, with headquarters at Jefferson City, Mo., succeeding F. E. Baugh, transferred.

L. R. Mann has been appointed general signal inspector of the Missouri Pacific, with headquarters at St. Louis, F. E. Baugh being appointed assistant general signal inspector, with office at the same place.

C. O. Ryborg and E. C. Lisle, signal instructors of the Pennsylvania Lines West, have been temporarily assigned to special work, and signal foremen H. F. Einsick and A. B. Eyster have been appointed acting signal inspectors.

#### OBITUARY

Charles W. Kouns, general manager of the Atchison, Topeka & Santa Fe, eastern lines, died at his home at Topeka, Kan., on September 3. Mr. Kouns was a member of the Conference Committee of the Railways that handled the recent wage controversy.

Joseph Richardson, chairman of the Southeastern Passenger Association, died at his home in Atlanta, Ga., September 3, at the age of 52. He was born at Auburn, N. Y., and at the age of 17 entered the service of the Pullman Company, at Philadelphia, as clerk. He remained with that company for about eleven years, rising to the position of superintendent at Jacksonville, Fla. In July, 1892, he was appointed general passenger agent of the Jacksonville, St. Augustine & Indian River, and with that road and its successor, the Florida East Coast, he remained four years. On July 1, 1896, he went to Atlanta to take the position which he held at the time of his death. Since 1897 his title has been chairman of the Southeastern Passenger Association.

## Equipment and Supplies

### LOCOMOTIVES

THE NEW YORK CENTRAL is reported as contemplating the purchase of 230 locomotives.

THE PENNSYLVANIA EQUIPMENT COMPANY, Philadelphia, Pa., is in the market for 25 to 30 second-hand Pacific type or similar locomotives.

### FREIGHT CARS

THE NEW YORK, CHICAGO & ST. LOUIS is in the market for 500 40-ton steel frame automobile cars.

THE FREEDOM OIL WORKS COMPANY, Freedom, Pa., has ordered 10 40-ton tank cars from the American Car & Foundry Company.

THE PENNSYLVANIA EQUIPMENT COMPANY, Philadelphia, Pa., is in the market for 2,000 to 3,000 second-hand flat cars of 20, 25 or 30 tons capacity.

RUSSIAN GOVERNMENT.—It is reported that the Russian Government has placed an order with the Bettendorf Company for 4,000 40-ton steel gondola cars.

THE LEHIGH VALLEY, reported in the *Railway Age Gazette* of August 18 as being in the market for 25 60-foot baggage cars, has ordered these cars from the Pullman Company.

### PASSENGER CARS

THE LONG ISLAND is inquiring for 60 coaches and 10 baggage cars.

THE NEW YORK CENTRAL has issued inquiries for 10 70-ft. coaches and one 73-ft. 6-in. dining car.

THE DELAWARE & HUDSON, reported in the *Railway Age Gazette* of June 30 as being in the market for 3 baggage cars, has ordered 3 baggage and mail cars from the Pullman Company.

THE NEW YORK, NEW HAVEN & HARTFORD also authorized the Osgood-Bradley Car Company to proceed with the construction of 40 baggage cars in addition to the 60 coaches mentioned in last week's issue. The New Haven has also ordered one private car from the Pullman Company.

### IRON AND STEEL

THE BALTIMORE & OHIO has ordered 250 tons of bridge steel from the American Bridge Company.

THE PIEDMONT & NORTHERN has ordered 500 tons of bridge steel from the Virginia Bridge & Iron Company.

THE CHICAGO, MILWAUKEE & ST. PAUL has ordered 226 tons of steel from the American Bridge Company for a bridge over Bay street, Tacoma, Wash.

PHILADELPHIA & READING.—Henry A. Hitner's Sons Company, Philadelphia, Pa., were the successful bidders in connection with the sale of the Philadelphia & Reading bridges over the Susquehanna river at Milton, Pa., about 2,000 ft. long, and at Sunbury, Pa., about 3,600 ft. in length. The company will commence to dismantle the superstructures at once.

### SIGNALING

THE CHICAGO, BURLINGTON & QUINCY is installing 312 one-arm and 83 two-arm Federal type-4 automatic block signals on 172 miles of line.

THE ATLANTA & WEST POINT will install automatic block signals on its line between East Point, Ga., and Newman, a distance of 39 miles.

THE MISSOURI, KANSAS & TEXAS will install a mechanical interlocking plant at Oswego, Kans. The contract has been let to the Union Switch & Signal Company.

THE CHICAGO & EASTERN ILLINOIS has plans under advisement for the construction of automatic block signals between Ft. Branch, Ind., and Ingle, Ind., a distance of 10 miles, single track.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS has authorized the installation of three interlocking plants; a 36-lever electro-mechanical plant, a 56-lever electro-mechanical plant and a 56-lever electric plant.

THE UNION SWITCH & SIGNAL COMPANY has been awarded a contract by the Alabama Great Southern to furnish the material required for the installation of an electro-mechanical interlocking plant at the crossing of this line with the Mobile & Ohio at Tuscaloosa, Ala.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS has asked for bids on an interlocking plant at Stevenson, Ala., where the Southern joins the tracks of this company. An electric interlocking plant has been authorized at Wauhatchie, Tenn., at the junction with the Alabama Great Southern and the Southern.

THE CHICAGO & NORTH WESTERN began work early in September on the installation of automatic block signals in connection with double tracking through Cedar Rapids, Ia., to Beverly, a distance of 55 miles. The new bridge over the Chicago river at Deering, Ill., was recently completed, and a new interlocking plant is being built to replace the old.

THE ATLANTIC COAST LINE is pushing rapidly the installation of new automatic block signals between Ashley Junction, S. C., and Charleston, S. C., a distance of 7 miles. There will be five interlockings through which automatic control is carried. Authority has been granted for the installation of a six-lever mechanical interlocking at the Rowland Lumber Company's crossing at Bowden, N. C.; a 20-lever mechanical interlocking at a crossing at Waycross, Ga., and a six-lever electro-mechanical interlocking with smash-boards, at Ogeechee River, Ga.

### New Work on the New Haven

THE NEW YORK, NEW HAVEN & HARTFORD is to install a G. R. S. electro-mechanical interlocking machine at Greenwich, Conn., comprising 32 electrical lever spaces, of which 21 have working levers, and 16 mechanical lever spaces, of which 10 have working levers. The installation will be done by the railroad's own forces.

Extensive changes have been authorized in the track layout at New Haven, Conn., which will include the reconstruction of two large interlocking plants, one a mechanical and the other electrical.

The signal department of this road is developing a signal system for the New York Connecting Railroad, the connecting line between this road and the Pennsylvania system, crossing Hell Gate bridge, New York City.

### Extension of Light Signals on the Pennsylvania

Continual progress is being made by the Pennsylvania in the installation of position-light signals between Philadelphia and Chestnut Hill, on the Philadelphia division, 12 miles, mostly four-track, incident to the electrification of the Chestnut Hill branch. It is not expected, however, that the work will be completed this year. Other position-light signal installations authorized or under way include five miles of two-track line between Shanley's Cut and Manhattan Transfer on the New York division; 4½ miles of six-track between South Elizabeth, N. J., and Rahway, N. J.; six miles of two-track from Camden, N. J., to Haddonfield, N. J., on the West Jersey & Seashore; seven miles of two-track between Selinsgrove Junction, Pa., and Sunbury, Pa., on the Sunbury division, and from Sunbury through three interlockings to Northumberland, Pa., on the Williamsport division. Position-light distant block and distant switch signals will also be installed at a number of points on various divisions. A large amount of miscellaneous interlocking work is also being carried out.

### MISCELLANEOUS

THE ATCHISON, TOPEKA & SANTA FE has awarded a contract to the Roberts & Schaefer Company, Chicago, for building a 400-ton, four-track, automatic electric coaling plant, using the duplex shallow pit loader, at the new terminal at Las Vegas, N. M. Contract price, \$22,000.



## Supply Trade News

The Greenfield Tap & Die Corporation, Greenfield, Mass., has discontinued its store in Detroit, Mich.

W. E. Sharp, whose election to the presidency of the Grip Nut Company, Chicago, Ill., has been announced, succeeds Edward R. Hibbard, retiring from business. Mr. Sharp began his railway



W. E. Sharp

career as an apprentice in the car department of the Erie in April, 1889. In October, 1892, he was promoted to general foreman of the car and locomotive department of the same road, with headquarters at Chicago. He left this position in 1898 to accept service with the Armour Car Lines as assistant superintendent, and in April, 1901, he became superintendent of this line. In 1911 he resigned this position to enter the railway supply business, becoming vice-president of the Grip Nut Company, which office he continued to fill until his election to the presidency.

R. W. Cameron & Co., New York, who maintain a staff of engineers in Australia and New Zealand in connection with their export business, have found it necessary to recall R. W. Nichols of their Australian staff to New York in order to cope with the increasing business in railway supplies, machine tools, steel products, etc., and will have the advantage of the services of an engineer who thoroughly understands conditions in Australasia as well as the United States and Canada.

Burton W. Mudge, president of Mudge & Co., Chicago, dealers in railway specialties, has also been elected president of the Safety First Manufacturing Company, Chicago, which will represent in Western territory the Franklin Manufacturing Company, Franklin, Pa., manufacturers of asbestos and magnesia products together with additional specialties. Mr. Mudge was formerly connected with the operating departments of the Atchison, Topeka & Santa Fe, the Chicago & North Western, the Fort Worth & Denver and the Chicago, Rock Island & Pacific, from which latter road he resigned as assistant to the general manager in 1908 to engage in the railway supply business. In September, 1908, he started



B. W. Mudge

the firm of Burton W. Mudge & Brother, representing the Commonwealth Steel Company, of St. Louis, Mo. Later the company name was changed to Burton W. Mudge & Co., and finally to Mudge & Co. The specialties to be handled by the Safety First Manufacturing Company under the direction of Mr. Mudge include a parcel rack for passenger cars, a caboose stove, angle cock brackets for freight cars and a combustion chamber for oil burning shop furnaces.

J. E. Saunders, formerly electrical engineer of the Union Switch & Signal Company, has been promoted to assistant chief engineer. D. R. Bell succeeds Mr. Saunders as electrical engineer and W. P. Neubert, who has been acting assistant to the chief engineer, has been made mechanical engineer.

Henry B. Denker, one of the founders of the St. Charles Car Company, now a part of the American Car & Foundry Company, died at St. Charles, Mo., on August 30, aged 77 years. Mr. Denker was a native of Germany and came to this country when 19 years of age. He served in the Union army as captain during the Civil War, and then assisted in establishing the car plant which afterward was merged with the larger concern. After the merger he was made district manager.

Howard H. Hibbard, whose election to the vice-presidency of the Grip Nut Company, Chicago, has already been announced in these columns, succeeds W. E. Sharp, who has recently been



H. H. Hibbard

elected president of the company. Mr. Hibbard is the son of Edward R. Hibbard, who is retiring from the presidency to make his home in California. Immediately on leaving school Howard H. Hibbard began his work in the company's plant at South Whitley, Ind., where he has made a careful study of the details of engineering and manufacturing of the devices handled by the company.

H. E. Brashares, formerly assistant signal engineer of the Great Northern Railway, has been appointed signal engineer of the Chicago

Railway Signal & Supply Company, Chicago, Ill.

Dwight E. Robinson, formerly eastern railway representative of the Acme White Lead & Color Works, Detroit, has been elected vice-president and treasurer of Thornton N. Motley & Co., Inc., manufacturers' agents, Grand Central Terminal, New York.

### Pollak Steel Company

The Pollak Steel Company, manufacturers of car and locomotive axles, with plants located at Cincinnati, Ohio, announces that it has taken over the Willard Sons & Bell Company of South Chicago, Ill., and will make axles there as well as in Cincinnati. The capacity of the plant at Cincinnati recently has been doubled and extensive improvements have been made in it in the way of additional buildings and new machinery. About 1,500 men are now employed at this plant and about 500 men at the South Chicago plant. The combined forging and axle output of the two plants is estimated at 30,000 tons per month.

Rodney D. Day, formerly general manager of sales for the William Tod Company, Youngstown, Ohio, has been appointed assistant to the vice-president of the company, with headquarters at Cincinnati. Mr. Day will be in full charge of all operations of both plants.

Frank Dunbar, formerly western sales manager of Brown & Co., of Pittsburgh, Pa., and for many years connected with the mechanical department of the Missouri Pacific, has been appointed district manager, with headquarters at South Chicago.

### TRADE PUBLICATIONS

SPRACO SYSTEM FOR COOLING CONDENSING WATER. This is the title of a 16-page booklet recently issued by the Spray Engineering Company, Boston, Mass. In the "Spraco" system the hot water is cooled by spraying it into the air so that when it falls into the basin or pond, its temperature is sufficiently reduced to permit of it being used over again. The booklet describes the system in detail, showing its advantages and the economies derived from its use and a number of views are given of Spraco

systems in operation. The same company has also issued two leaflets relating respectively to the "Vaughan Flow Meter" and "Cooling Water for Ice Plants."

**LOCOMOTIVE TANKS.**—The Locomotive Tank Company, New York, has issued a folder descriptive of the Acme-Flanged sectional locomotive tank. The distinguishing feature of the tank is that the top and bottom are formed from plates with edges turned toward the water space, thus eliminating all rivet holes through top and bottom.

**TRAIN LIGHTING BATTERIES.**—Bulletin 118, recently issued by the Edison Storage Battery Company, Orange, N. J., bears the title, Train Lighting Batteries, Edison. The booklet defines the various points of superiority of the Edison alkaline storage battery, touching upon its advantages under the heads of weight, maintenance and operation, life, temperature, efficiency and care. Several pages in the bulletin are devoted to a description of its manufacture.

**PASSENGER CAR TRIMMINGS.** Catalogue No. 200 recently issued by the Dayton Manufacturing Company, Dayton, Ohio, is 9 in. by 12 in. in size and contains 1,600 pages of illustrations of passenger car trimmings of all kinds. The book is a complete catalogue of passenger car hardware, lighting fixtures, water and dry closets, washstands and saloon fittings, vestibule and platform trimmings, brake handles, sash fixtures, basket racks, head-lights, etc.

**PULVERIZED COAL EQUIPMENT.**—This is the title of catalogue No. 71 recently issued by the Lehigh Car, Wheel & Axle Works, Fullerton, Pa. The booklet is 8 by 10½ in. in size, and contains 28 pages. It gives descriptions and illustrations of the following units used for the production of pulverized coal: The Fuller-Lehigh pulverizer mill, Lehigh coal crushing rolls; indirect fired rotary dryers; pulverized coal feeders, and Fuller quality sprockets.

**WELDING AND CUTTING.**—The Searchlight Company, Chicago, is now distributing catalogue No. 12 on Searchlight welding and cutting equipment. The booklet, to quote from its title page, is "A book of specific information on the welding and cutting of metals by the oxy-acetylene process, together with a catalogue of the equipment necessary for such work." There are many illustrations showing the Searchlight equipment and the work for which it is adapted.

**MORTAR.**—The Hydrated Lime Bureau of the National Lime Manufacturers' Association, Pittsburgh, Pa., has issued a 32-page booklet describing a series of tests conducted by J. S. Macgregor, professor of civil engineering, Columbia University, on the effect of adding hydrated lime to cement mortar used in brick work. This booklet contains a large amount of interesting information regarding these tests, showing that the use of hydrated lime results in a greater strength at a less expense for materials.

**INGERSOLL-RAND COMPANY.**—This company has recently issued three new bulletins as follows: Form 9,024 deals with steam condensing plants of the Beyer barometric type. The Beyer condenser is of the barometric counter-current type, in which the air and vapor leaving the condenser move counter to or in an opposite direction to the incoming water. As a result, the air contained in the water is removed before the mixture of water and steam takes place, and the air and vapor leave at a comparatively low temperature. The catalogue describes the fundamental principles of steam condensing plants in minute detail, and compares the Beyer barometric condenser with low level jet condensers and surface condensers. Auxiliary apparatus, such as vacuum pumps and centrifugal water pumps is also illustrated and described in detail. Form 4,122 describes the IR Model Leyner drill sharpener. This bulletin explains and illustrates the sharpener in detail, and shows the various styles of bits. Machine sharpeners, it is asserted, not only make uniform bits, but make them at less expense and with greater satisfaction than can be done by hand. Form 3,033 describes the Imperial "XPV" duplex steam driven compressors, produced to meet a demand for a steam driven air compressor designed and constructed to operate satisfactorily under "high pressures" and "superheat," as well as under "ordinary steam" conditions. The catalogue shows the various sizes and capacities, and explains in detail the operation of the Imperial piston valve.

## Railway Construction

**ALEXANDRIA & WESTERN.**—According to press reports an extension is to be built west to Leesville, La. The company now operates a line from Alexandria, La., west to Gardner, about 15 miles. (April 7, p. 817.)

**CHARLESTON INTERURBAN.**—This company will probably build an extension next year to Montgomery, W. Va., about ten miles. No arrangements have yet been made for the construction of this line.

**FLORIDA ROADS (ELECTRIC).**—It is understood that preliminary work will be started this year on a proposed electric line from St. Augustine, Fla., north to Jacksonville, about 40 miles. T. R. Osmond, St. Augustine, may be addressed.

**MITCHELL & NORTHWESTERN.**—Application has been made in South Dakota by residents of Mitchell, for permission to build a railway from Mitchell, S. D., northwest via Crow Lake and Gann valley to Highmore, through the counties of Davison, Aurora, Jerauld, Buffalo, Hand and Hyde about 100 miles.

**MOREHEAD & NORTH FORK.**—Work on an extension of this road has been resumed, it is said, from Redwine, Ky., southeast to Lenox, about 5 miles, and it is expected that the line will be completed about December 1. The company now operates a 25-mile line from Morehead, Ky., southeast to Redwine.

**NASHVILLE & EASTERN ELECTRIC.**—DeKalb county, Tenn., has voted to issue \$150,000 of bonds, it is said, in aid of the construction of this proposed line. The projected route is from Lebanon, Tenn., southeast to Smithville, about 35 miles. C. Edwards, Smithville, is interested.

**NEW YORK SUBWAYS.**—The New York Public Service Commission, First district, will receive bids on September 18 for the installation of tracks for a portion of the new Culver line in the borough of Brooklyn. This work is on the section from a point between Eighth and Ninth avenues near Thirty-eighth street to a point at or near Avenue X and Gravesend avenue.

**OGDEN, LOGAN & IDAHO.**—This company is expected to complete and have ready for operation by September 15 the new cut-off being constructed between Hot Springs, Utah and Brigham, Utah, a distance of 12.6 miles. The cut-off is considered quite an improvement, both as regards time and expense. The grading was done by the Utah Construction Company. Only one small bridge was required over the entire district.

**PENNSYLVANIA RAILROAD.**—This company has let a contract for carrying out improvements at Phillipsburg, Pa. The first part of the work consists of building a main track next to the river from Lehigh Junction to Lopatcong creek, 1.46 miles; this work includes building a bridge over Lopatcong creek and the necessary grading for the main track.

**PETERSBURG & APPOMATTOX (ELECTRIC).**—Work is now under way building an extension from Hopewell, Va., to City Point, about 2.5 miles. The Vaughan Construction Company, Roanoke, Va., has the contract for the work. The company now operates a 10-mile electric line from Petersburg to Hopewell. (March 17, p. 527.)

**PHILADELPHIA & READING.**—This company has given contracts to the John A. Kelly Company, Philadelphia, Pa., for grading and masonry work, and to the Phoenix Bridge Co., Phoenixville, Pa., for the bridge work in connection with laying additional parallel tracks on the New York division between Hopewell, Pa., and Trenton Junction. The work calls for 32,000 cu. yd. of excavation a mile; the maximum grade will be 0.3 per cent, and the maximum curvature 2 deg. There will be three arch culverts consisting of from 6 ft. to 24 ft. spans and eight bridges varying in length from 18 ft. to 60 ft. spans. The work calls for the use of 75 tons of steel and constructing 6,700 cu. yd. of concrete.

**SOUTHERN PACIFIC.**—Surveys are being made for a new line to run from Milton, Cal., to Copperopolis, a distance of 18 miles. It has not yet been decided when construction work will be commenced.



**VAN BUREN RAILROAD.**—Incorporated in Tennessee, with \$300,000 capital, to build from Doyle, Tenn., on the Nashville, Chattanooga & St. Louis south to Onward, and thence to Gillentine in Van Buren county, about 10 miles. The incorporators include J. J. Lynch, M. M. Allison, Chattanooga, Tenn.; E. N. Haston and C. B. Cuthbert.

**VIRGINIA ROADS.**—The question of building a line connecting Goshen, Va., with Monterey to develop timber lands, is said to be under consideration. K. T. Crawley, Richmond, Va., may be addressed.

## RAILWAY STRUCTURES

**BOSTON, MASS.**—The New York, New Haven & Hartford will build eleven new steel girder highway bridges of single 57-ft. spans with concrete masonry abutments. The improvements will cost about \$829,000. Bids have not yet been asked for the work.

**EAST DEERFIELD, MASS.**—The Boston & Maine has given a contract to the H. Wales Lines Company, Meriden, Conn., to build a locomotive shop at East Deerfield. It will be of brick and steel construction 40 ft. high, 170 ft. wide, and 200 ft. long. The improvements will cost about \$80,000.

**LEWISTON, MAINE.**—A contract is reported let by the Maine Central to F. W. Cunningham & Son, Portland, to build a new station at Lewiston.

**MYSTIC, CONN.**—The New York, New Haven & Hartford will build a steel bridge 32 ft. wide and 180 ft. long over the Mystic river.

**NEW ORLEANS, LA.**—A constitutional amendment, authorizing the construction of a bridge or tunnels to connect the east and west banks of the Mississippi river at or near New Orleans, will be submitted to the voters of Louisiana on November 7, and is expected to be carried. The Public Belt Railroad Commission of New Orleans will be charged with the construction of a structure across the Mississippi river, and would like to hear from engineering firms who want to submit applications for contracts in connection with the work.

**POCATELLO, IDAHO.**—The Oregon Short Line is greatly enlarging several of its enginehouses along the line. Besides the 18-stall annex at this point, construction work is progressing rapidly on additions to other enginehouses as follows: 5 stalls at Salt Lake City, Utah; 5 stalls at Montpelier, Idaho; 5 stalls at Glenn's Ferry, Idaho, and 4 stalls at Dubois, Idaho. New facilities at Nampa, Idaho, including a 6-stall enginehouse and machine shop annex, also are nearing completion. The track lying on the new extension of the Marshfield branch from Marshfield, Idaho, to Idaho, Idaho, a distance of 19 miles, previously mentioned in the *Railway Age Gazette* under date of July 14, 1916, is expected to be pushed from now until the road is ready for business.

**RUTHERFORD, N. J.**—Regarding the report that the Erie Railroad will eliminate the grade crossing at Park avenue, an officer writes that no definite decision has yet been reached, regarding the carrying out of this work.

**ST. JOHN, N. B.**—Bids are wanted until September 18 by J. W. Pugsley, secretary Department of Railways and Canals, Ottawa, Ont., for constructing the foundations of a grain elevator, working house and track shed at St. John. The elevator is to have a storage capacity of 500,000 bushels.

**TRENTON, N. J.**—The Pennsylvania Railroad has given a contract to the John A. Kelley Company, Philadelphia, Pa., for the elimination of the grade crossings at Whitehead's road and East Clinton avenue east of Trenton station, on the main line, New York division. The present grade crossing at Whitehead's road is across 6 tracks. The new overhead bridge at Whitehead's road is to be of steel with concrete abutments and piers. It provides space for 7 tracks. The new bridge over East Clinton avenue will be of half-through girders resting on concrete abutments with columns on the curb line. This bridge provides space for 7 tracks. (April 28, p. 975.)

**TUSCALOOSA, ALA.**—A warehouse will be built by the Tuscaloosa Railway & Utilities Co., at Tuscaloosa.

## Railway Financial News

**BOSTON & MAINE.**—See Connecticut River Railroad and Vermont Valley Railroad.

**CONNECTICUT RIVER RAILROAD.**—Judge Morton in the United States District Court at Boston on August 31 appointed James H. Hustis temporary receiver. As noted in last week's issue, Mr. Hustis was appointed on August 29 temporary receiver of the Boston & Maine, which leases the Connecticut River Railroad.

**KANAWHA & WEST VIRGINIA.**—See Kanawha & Michigan.

**KANAWHA & MICHIGAN.**—This company has purchased all or nearly all of the \$1,359,600 stock of the Kanawha & West Virginia, outstanding, and has assumed \$1,000,000 5 per cent first mortgage bonds, due July 1, 1955. The Kanawha & Michigan is one of the New York Central lines. The Kanawha & West Virginia runs from Charleston, W. Va., to Blakely up Elk river, 33 miles; it is to be extended into the coal fields.

**MINNEAPOLIS & ST. LOUIS.**—E. L. Brown, formerly vice-president and general manager of the Denver & Rio Grande, was on August 31 elected president of the Minneapolis & St. Louis, to succeed Newman Erb, who has resigned. A complete new board of directors was also elected as follows: Charles Hayden, of Hayden, Stone & Co., chairman; Edward L. Brown; E. V. R. Thayer, president of the Merchants National Bank of Boston; John A. Spoor, president, Chicago Junction Stock Yards; J. S. Bache, Frank P. Frazier, F. H. Davis of the Edwin Hawley estate; Colonel Slocum, of the Russel Sage estate; H. E. Huntington, S. B. Novembre and Thomas Gibson. C. W. Huntington was re-elected vice-president, but not general manager.

The following directors resigned: Newman Erb, W. J. Wollman, A. C. Doan, Ward E. Pearson, T. P. Shonts and Frank Trumbull.

**VERMONT VALLEY RAILROAD.**—James H. Hustis, temporary receiver of the Boston & Maine and the Connecticut River Railroad, was on August 31 also appointed receiver of the Vermont Valley Railroad. This company is a subsidiary of the Connecticut River Railroad, who is also in receivership, as noted elsewhere in this column.

**WESTERN PACIFIC RAILROAD CORPORATION.**—This company has been organized with the election of the following directors: C. Ledyard Blair, of Blair & Co.; F. H. Ecker, treasurer Metropolitan Life Insurance Company; Alvin W. Krech, president Equitable Trust Company; A. M. Hunt, San Francisco; R. W. Martin, of Wm. A. Read & Co.; Starr J. Murphy, of the Rockefeller Foundation; William Salomon, of Wm. Salomon & Co., and R. B. Young, of E. H. Rollins & Sons. The Western Pacific Railroad Corporation is the holding company controlling the Western Pacific Railroad Company, the operating company.

**FRENCH RAILWAY PROSPERITY.**—French industrial and economic activity is reviving, although some of the richest districts of France are still in the hands of the enemy, and although France has already spent in two years of war nearly \$10,000,000,000. Railway receipts show the greatest resumption of prosperity, the total for the Western, the Paris, Lyons & Mediterranean, Orléans, and the Midi Railways reaching \$144,000,000 for the first six months of the present year, as against \$123,400,000 for the first half of 1915. This total actually shows an excess of \$13,600,000 over peace time; that is, for the first six months of 1914. A great portion of the Northern Railway system and some part of the Eastern Railway system are still in the hands of the enemy, and both systems are almost entirely in the zone of the armies. Nevertheless, the Northern receipts reached \$23,800,000 for the first half of 1916, as against \$14,800,000 for the corresponding period of 1915; and the Eastern receipts for the same period were \$22,800,000 for 1916, and \$15,200,000 for 1915.

# ANNUAL REPORT

## CANADIAN PACIFIC RAILWAY COMPANY THIRTY-FIFTH ANNUAL REPORT

DIRECTORS OF THE CANADIAN PACIFIC RAILWAY COMPANY.  
YEAR ENDED JUNE 30TH, 1916.

### To the Shareholders.

The accounts of the Company for the year ended June 30th, 1916, show the following results:—

Gross Earnings .....	\$129,481,885.74
Working Expenses .....	80,255,965.28
Net Earnings .....	\$49,225,920.46
Deduct Fixed Charges.....	10,306,196.06
Surplus .....	\$38,919,724.40
Contribution to Pension Fund.....	125,000.00
	\$38,794,724.40

Deduct Net Earnings of Pacific Coast Steamships, Commercial Telegraph, and News Department, transferred to Special Income Account .....	1,923,288.96
	\$36,871,435.44

From this there has been charged a half yearly dividend on Preference Stock of 2 per cent., paid April 1st, 1916 .....	\$1,613,638.42
And three quarterly dividends on Ordinary Stock of 1¼ per cent. each, paid December 31st, 1915, April 1st, 1916, and June 30th, 1916 .....	13,650,000.00
	15,263,638.42
	\$21,607,797.02

From this there has been declared a second half yearly dividend on Preference Stock, payable October 1st, 1916.....	\$1,613,638.42
And a fourth quarterly dividend on Ordinary Stock 1¼ per cent., payable October 1st, 1916 .....	4,550,000.00
	6,163,638.42

Leaving net surplus for the year..... \$15,444,158.60

In addition to the above dividends on Ordinary Stock, three per cent. was paid from Special Income.

### THE FOLLOWING ARE THE DETAILS OF SPECIAL INCOME FOR YEAR ENDED JUNE 30TH, 1916.

Balance at June 30th, 1915.....	\$8,216,144.15
Less Dividend paid October 1st, 1915.....	1,950,000.00
	\$6,266,144.15
Interest on Proceeds Land Sales.....	151,170.51
Interest on Deposits and Loans.....	976,326.08
Interest from Minneapolis, St. Paul & S. S. Marie Ry. Bonds	159,720.00
Interest from Mineral Range Ry. Bonds.....	50,160.00
Interest from Toronto, Hamilton & Buffalo Ry. Bonds.....	10,237.78
Interest from Montreal & Atlantic Ry. Bonds and other Securities .....	108,136.03
Interest from Berlin, Waterloo, Wellesley & Lake Huron Ry. Bonds .....	17,040.00
Interest from St. John Bridge & Railway Extension Co. Bonds .....	6,250.00
Interest from Esquimalt & Nanaimo Ry. Bonds.....	193,280.00
Interest from Dominion Atlantic Ry. Extension Debenture Stock .....	56,940.00
Interest from Dominion Atlantic Ry. 2nd Debenture Stock..	36,986.67
Interest from Hull Electric Railway.....	60,000.00
Dividend on St. John Bridge & Railway Extension Co. Stock	70,000.00
Dividends on Minneapolis, St. Paul & S. S. Marie Ry. Common Stock .....	890,645.00
Dividends on Minneapolis, St. Paul & S. S. Marie Ry. Preferred Stock .....	445,326.00
Dividends on West Kootenay Power & Light Co. Common Stock .....	27,500.00
Dividends on West Kootenay Power & Light Co. Preferred Stock .....	3,850.00
Dividends on Consolidated Mining & Smelting Co. Stock....	307,437.50
Dividend on Berlin, Waterloo, Wellesley & Lake Huron Ry. Stock .....	12,500.00
Earnings from Ocean Steamships and Hotels.....	3,583,292.28
Revenue from Company's Interest in Coal Mine Properties..	557,842.72
Extraneous Mail Earnings.....	216,305.07
Net Earnings on Pacific Coast Steamships, Commercial Telegraph, News Department .....	1,923,288.96

Received for Space Rented in Office Buildings..... 76,720.34

### Less:—Payments to Shareholders in dividends:

December 31st, 1915, April 1st, 1916, and June 30th, 1916 .....

\$16,207,099.09

5,850,000.00

\$10,357,099.09

From this a dividend has been declared payable October 1st, 1916 .....

1,950,000.00

2. The working expenses for the year amounted to 61.98 per cent. of the gross earnings, and the net earnings to 38.02 per cent. as compared with 66.04 and 33.96 per cent., respectively, in 1915.

3. There were no sales during the year of four per cent. Consolidated Debenture Stock, four per cent. Preference Stock or other Capital Securities.

4. The sales of agricultural land during the year were 390,715 acres for \$6,126,108.00, being an average of \$15.68 per acre. Included in this area were 8,046 acres of irrigated land which brought \$54.67 per acre, so that the average price of the balance was \$14.86 per acre.

5. You will be asked to give your approval to an Agreement between the New York Central, Michigan Central, and Canada Southern Railway Companies and your Company, and the Toronto, Hamilton & Buffalo Railway Company, which, in addition to providing for the interchange of traffic passing over the latter Company's lines, provides for the issuance by the Toronto, Hamilton & Buffalo Railway Company of First Mortgage Consolidated Bonds not exceeding in amount \$10,000,000., bearing interest at a rate not in excess of 5% per annum, to be issued only with the consent of the other Companies, parties to the Agreement, and to be unconditionally guaranteed as to principal and interest by these Companies jointly and severally.

6. In consequence of the extraordinary conditions created by the present War your Directors considered it advisable to postpone the effective date of the Agreement entered into between your Company and the Allan Line Steamship Company and the Canadian Pacific Ocean Services Limited, authorized by Resolution passed at the last Annual Meeting, for the acquisition by the last named Company of the Capital Stock of the Allan Line now held by your Company and of the vessels of your Company named in the Resolution. Your Directors have, however, thought it desirable to enter into an Agreement with the Canadian Pacific Ocean Services Limited under which the vessels of both fleets are operated by that Company as Managers and Agents. In view of possible changes in the conditions pertaining to ocean traffic, your Directors consider that it may be advisable, in your Company's interests, that in giving effect to the proposals previously approved a somewhat different plan should be adopted, and a Resolution will be submitted granting authority to your Directors to carry out the transaction with the Ocean Services or some other Company created for that purpose, of which Company your Company will have full ownership and control in such manner and on such terms as seem to them proper.

7. The revenue from your steamships given in the statement of Special Income is exclusive of an amount transferred to the Reserve Account to cover the cost of replacing ships sold or destroyed, and of a sum sufficient to meet any tax on excess profits that may be ultimately payable.

8. The relations between the Consolidated Mining & Smelting Company and the West Kootenay Power & Light Company were such as to make it desirable, in the interest of both properties, that they should be under one control, and in order that this might be accomplished, your Company joined with the other shareholders in the West Kootenay Power & Light Company in exchanging its holding of Common Stock in that Company for shares in the Consolidated Mining & Smelting Company, on a basis of \$75 of the stock of the Consolidated Company for each \$100 face value Common Stock of the West Kootenay Company.

9. Your Directors appropriated for Expenditure on Capital Account in the calendar year the amount of \$3,749,474. Of this, \$1,955,000. was required for the Connaught Tunnel in the Selkirk Mountains, and the balance for miscellaneous works of improvement over the whole system.

10. The profits resulting from the manufacture in your Company's shops of munitions of war undertaken at the request of Government, have not been taken into the operating revenue, but have been applied as a set-off against contributions to Patriotic and Relief Funds, and other expenditures by your Company directly due to the war and not properly chargeable to working expenses.

11. The important falling off in the revenue per ton mile for the carriage of freight traffic from .76 cents in 1915 to .64 cents this year, was largely due to the abnormal increase in the tonnage of grain handled at the very low rates that apply to that commodity, although the reduction in many tariff rates in Western Canada had considerable influence.

12. There being some doubt as to the right of the Company to issue its Preference and Debenture Stocks in dollar currency as well as sterling, the requisite authority to do so was secured by Act of Parliament at the last Session.

13. In November last the Trustees under the Mortgage securing £7,191,500 First Mortgage Bonds executed a discharge of mortgage and reconveyance of the property to the Company, and the documents have been deposited with the Honourable the Secretary of State at Ottawa.

14. Mr. E. W. Beatty, K.C., Vice-President and General Counsel, was elected a Director of the Company to fill the vacancy caused by the resignation of Mr. David McNicoll.

15. The under-mentioned Directors will retire from office at the approaching Annual Meeting. They are eligible for re-election,—

Mr. WILMOT D. MATTHEWS,  
Mr. AUGUSTUS M. NANTON,  
Mr. GEORGE BURY.

For the Directors,  
SHAUGHNESSY,  
President.

MONTREAL, August 14th, 1916.



## GENERAL BALANCE SHEET, JUNE 30TH, 1916.

## CANADIAN PACIFIC RAILWAY COMPANY

ASSETS	
PROPERTY INVESTMENT:	
Railway .....	\$352,971,897.76
Rolling Stock Equipment.....	153,605,367.56
Ocean, Lake and River Steamers.....	24,211,713.33
	<u>\$530,788,978.65</u>
ACQUIRED SECURITIES (Cost):	
Schedule "A" .....	111,793,714.53
ADVANCES ON LINES AND STEAMSHIPS UNDER CONSTRUCTION .....	42,852,519.99
ADVANCES AND INVESTMENTS.....	9,639,472.07
DEFERRED PAYMENTS ON LANDS AND TOWNSITES SALES, No. 2.....	12,006,140.61
*SPECIAL INVESTMENT FUND:	
Deferred Payments on Lands and Townsites .....	39,044,383.42
Government Securities .....	10,088,734.86
Deposited with Trustee.....	7,135,650.56
	<u>56,268,768.84</u>
WORKING ASSETS:	
Material and Supplies on Hand.....	\$11,814,583.84
Agents' and Conductors' Balances.....	1,819,709.40
Net Traffic Balances.....	512,056.88
Miscellaneous Accounts Receivable.....	8,737,605.83
Temporarily Invested in War Loans.....	5,272,690.63
Cash in Hand .....	41,581,680.69
	<u>69,738,327.27</u>
OTHER ASSETS:	
Schedule "B" .....	127,129,135.93
	<u>\$960,217,057.89</u>

\*Security for issue of Note Certificates, \$52,000,000.

LIABILITIES	
CAPITAL STOCK:	
Ordinary Stock .....	\$260,000,000.00
Four Per Cent. Preference Stock.....	80,681,921.12
	<u>\$340,681,921.12</u>
FOUR PER CENT. CONSOLIDATED DEBENTURE STOCK .....	
	176,284,882.10
MORTGAGE BONDS:	
Algoma Branch 1st Mortgage 5 per cent....	3,650,000.00
NOTE CERTIFICATES 6 PER CENT.....	52,000,000.00
PREMIUM ON ORDINARY CAPITAL STOCK SOLD .....	45,000,000.00
CURRENT:	
Audited Vouchers .....	5,185,207.45
Pay Rolls .....	4,789,748.92
Miscellaneous Accounts Payable.....	5,536,269.10
	<u>15,511,225.47</u>
ACCRUED:	
Rentals of Leased Lines and Coupons on Mortgage Bonds .....	531,658.91
EQUIPMENT OBLIGATIONS .....	11,680,000.00
RESERVES AND APPROPRIATIONS:	
Equipment Replacement .....	4,978,627.79
Steamship Replacement .....	5,384,028.92
Reserve Fund for Contingencies and for Contingent War Taxes .....	14,103,178.79
Marine Insurance Fund.....	335,960.86
	<u>24,801,796.36</u>
NET PROCEEDS LANDS AND TOWNSITES.....	68,255,803.19
SURPLUS REVENUE FROM OPERATION.....	100,604,596.60
SURPLUS IN OTHER ASSETS.....	121,215,174.14
	<u>\$960,217,057.89</u>

I. G. OGDEN,  
Vice-President.

## AUDITORS' CERTIFICATE.

We have examined the Books and Records of the Canadian Pacific Railway Co. for the fiscal year ending June 30th, 1916, and having compared the annexed Balance Sheet and Income Account therewith, we certify that, in our opinion, the Balance Sheet is properly drawn up so as to show the

true financial position of the Company at that date, and that the relative Income Account for the year is correct.

PRICE, WATERHOUSE & CO.,

Montreal, August 10th, 1916.

Chartered Accountants (England).

## FIXED CHARGES FOR YEAR ENDED JUNE 30TH, 1916.

£ 200,000	St. Lawrence & Ottawa Ry. 4% First Mortgage Bonds .....	\$ 38,933.34
\$2,544,000	Man. S. West. Colzn. Ry. 1st Mortgage 5% Bonds due June 1st, 1934.....	127,200.00
£4,007,381 15 5	Ontario & Quebec Ry. Debenture Stock 5% .....	975,129.56
\$2,000,000	Ontario & Quebec Ry. Ordinary Stock 6% .....	120,000.00
£1,330,000	Atlantic & North West. Ry. 1st Mortgage Bonds, due January 1st, 1937.....	323,633.34
£ 750,000	Algoma Branch 5% 1st Mortgage Bonds due July 1st, 1937.....	182,500.00
\$ 500,000	New Brunswick Southern Ry. 1st Mortgage Bonds, 3%.....	15,000.00
\$ 500,000	Lindsay, Bobcaygeon & Pontypool Ry. 1st Mortgage Bonds, 4%.....	20,000.00
	Rental, Toronto, Grey & Bruce Ry.....	140,000.00
	Rental, Calgary & Edmonton Ry.....	218,357.60
	Rental, Farnham to Brigham Jct.....	1,400.00
	Rental, Mattawankeag to Vanceboro.....	23,800.00
	Rental, New Brunswick Ry. System.....	372,829.74
	Rental, Terminals at Toronto.....	25,968.71
	Rental, Terminals at Hamilton.....	38,877.61
	Rental, Hamilton Jct. to Toronto.....	43,487.40
	Rental, St. Stephen and Milltown Ry....	2,050.00
	Rental, Joliette & Brandon Ry.....	5,000.00
	Rental, Lachine Canal Branch.....	939.96
	Interest on Montreal & Western Ry.....	12,501.84
	Interest on Equipment Obligations.....	567,191.66
		<u>\$3,254,800.76</u>
£36,222,921	4% CONSOLIDATED DEBENTURE STOCK .....	7,051,395.30
		<u>\$10,306,196.06</u>

## STATEMENT OF EARNINGS FOR THE YEAR ENDED JUNE 30TH, 1916.

From Passengers .....	\$ 24,690,652.19
" Freight .....	89,654,405.19
" Mails .....	1,384,567.43
" Sleeping Cars, Express, Telegraph and Miscellaneous..	13,752,260.93
Total .....	<u>\$129,481,885.74</u>

## STATEMENT OF WORKING EXPENSES FOR THE YEAR ENDED JUNE 30TH, 1916.

Transportation Expenses .....	\$38,915,381.50
Maintenance of Way and Structures.....	14,671,791.20
Maintenance of Equipment .....	16,695,955.87
Traffic Expenses .....	2,798,699.40
Farlor and Sleeping Car Expenses.....	990,410.87
Expenses of Lake and River Steamers.....	829,811.73
General Expenses .....	4,014,753.69
Commercial Telegraph .....	1,339,161.02
Total .....	<u>\$80,255,965.28</u>

## STATEMENT OF SURPLUS INCOME ACCOUNT, JUNE 30TH, 1916.

Balance at June 30th, 1915.....	\$83,019,483.06
Net Earnings of Railway.....	\$36,871,435.44
Special Income .....	9,940,954.94
	<u>46,812,390.38</u>
	<u>\$129,831,873.44</u>
Less: Dividends on Preference Stock paid October 1st, 1915, and April 1st, 1916 .....	3,227,276.84
Dividends on Ordinary Stock paid October 1st, 1915, December 31st, 1915, April 1st, 1916, and June 30th, 1916 .....	26,000,000.00
	<u>29,227,276.84</u>
	<u>\$100,604,596.60</u>

## DESCRIPTION OF FREIGHT FORWARDED.

	YEAR ENDED 30TH JUNE		
	1914	1915	1916
Flour .....	8,802,250	8,538,600	10,499,260
Grain .....	184,954,241	126,909,828	276,788,209
Live Stock .....	2,481,360	2,833,726	2,190,389
Lumber .....	2,953,125,699	2,180,735,600	2,696,804,934
Firewood .....	287,910	254,428	298,426
Manufactured Articles.....	8,148,012	6,024,590	7,960,723
All other articles.....	9,159,112	7,423,163	8,228,156

## FREIGHT TRAFFIC.

	YEAR ENDED 30TH JUNE		
	1914	1915	1916
Number of Tons Carried.....	27,801,217	21,490,596	29,276,872
Number of Tons Carried One Mile .....	10,821,748,859	7,940,151,342	14,057,685,773
Earnings per Ton per Mile....	0.75 cents	0.76 cents	0.64 cents

## PASSENGER TRAFFIC.

	YEAR ENDED 30TH JUNE		
	1914	1915	1916
Number of passengers carried..	15,638,312	13,202,603	13,833,978
Number of passengers carried one mile .....	1,587,368,110	1,164,488,630	1,255,561,198
Earnings per passenger per mile	2.05 cents	2.06 cents	1.97 cents

## TRAIN TRAFFIC STATISTICS—FOR TWELVE MONTHS ENDED JUNE 30TH, 1916 AND 1915.

EARNINGS OF LAKE AND RIVER STEAMERS NOT INCLUDED IN THIS STATEMENT.

	Year ended June 30th, 1916.	Year ended June 30th, 1915.	Increase or Decrease.	
			Amount or number.	Per Cent.
TRAIN MILEAGE.				
Passenger trains.....	18,159,545	17,977,033	182,512	1.02
Freight ".....	25,355,997	16,896,368	8,459,629	50.07
Mixed ".....	2,098,825	1,939,478	159,347	8.22
Total trains.....	45,614,367	36,812,879	8,801,488	23.91
CAR MILEAGE.				
PASSENGER.				
Coaches and P. D. and S. cars.....	88,080,027	87,283,067	796,960	.91
Combination cars.....	2,835,311	2,829,455	5,856	.21
Baggage, Mail and Express cars.....	39,335,804	40,691,990	1,356,186	3.33
Total Passenger cars.....	130,251,142	130,804,512	553,370	.42
FREIGHT.				
Loaded.....	603,705,406	404,249,594	199,455,812	49.34
Empty.....	280,241,711	144,408,527	135,833,184	94.06
Caboose.....	27,558,813	18,476,337	9,082,476	49.16
Total Freight cars.....	911,505,930	567,134,458	344,371,472	60.72
Passenger cars per Traffic Train Mile.....	6.43	6.57	.14	2.13
Freight " " " " ".....	33.20	30.11	3.09	10.26
PASSENGER TRAFFIC.				
Passengers carried (earning revenue).....	13,727,219	13,086,064	641,155	4.90
" " " " one mile.....	1,247,118.119	1,155,371.348	91,746.771	7.94
Passengers carried (earning revenue) one mile per mile of road.....	96.546	93.413	3,133	3.35
Average journey per passenger.....miles	90.85	88.29	2.56	2.90
Average amount received per passenger.....\$	1.78	1.81	.03	1.66
" " " per passenger mile.....cts.	1.96	2.05	.09	4.39
Average number of passengers per train mile.....	61.56	58.01	3.55	6.12
" " " " car ".....	13.72	12.82	.99	7.02
Revenue from passengers per passenger car mile.....cts.	26.84	26.32	.52	1.98
Total passenger train earnings per train mile.....\$	1.55	1.53	.02	1.31
" " " " " mile of road.....\$	2,425.15	2,468.87	43.72	1.77
FREIGHT TRAFFIC.				
Tons of revenue freight carried one mile.....	13,822,509,920	7,734,433,065	6,088,067,855	78.71
" non-rev. " " " ".....	1,300,624,817	985,500,816	315,124,001	31.98
Total tons (all classes) freight carried one mile.....	15,123,125,737	8,719,933,881	6,403,191,856	73.43
Tons of revenue freight carried one mile per mile of road.....	1,070,068	625,338	444,730	71.12
Tons of non-rev. freight carried one mile per mile of road.....	100,688	79,679	21,009	26.37
Total tons (all classes) freight carried one mile per mile of road.....	1,170,756	705,017	465,739	66.06
Average amount received per ton per mile of revenue freight.....cts.	0.641	0.773	0.132	17.08
Average No. of tons of revenue freight per train mile.....	503.46	410.62	92.84	22.61
" " " non-rev. " " ".....	47.37	52.32	4.95	9.46
" " " (all classes) " " ".....	550.83	462.94	87.89	18.99
" " " revenue freight per loaded car mile.....	22.90	19.13	3.77	19.71
Average No. of tons of non-rev. freight per loaded car mile.....	2.15	2.44	.29	11.89
Average No. of tons of (all classes) freight per loaded car mile.....	25.05	21.57	3.48	16.13
Freight train earnings per loaded car mile.....cts.	14.68	14.79	.11	.74
" " " " train mile.....\$	3.23	3.17	.06	1.89
" " " " mile of road.....\$	6,860.21	4,832.53	2,027.68	41.96